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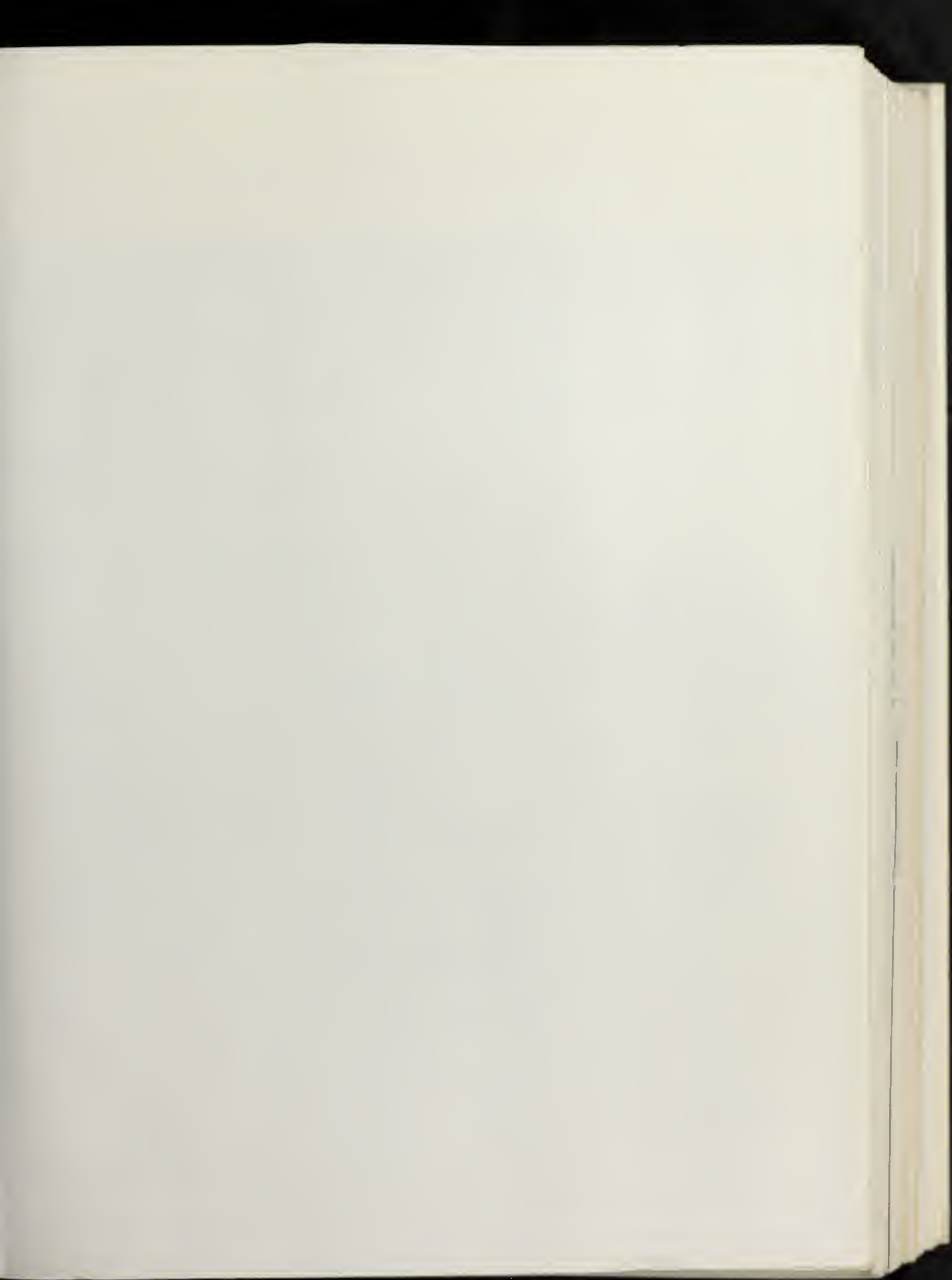
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REASONS FOR INTERSTATE MIGRATION

Jobs, Retirement, Climate, and
Other Influences

by H. Long and Kristin A. Hansen

CURRENT POPULATION REPORTS

Special Studies
Series P-23, No. 81

U.S. Department
of Commerce

BUREAU
OF THE CENSUS



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Issued March 1979



U.S. Department of Commerce

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Library of Congress Cataloging in Publication Data

Long, Larry H
Reasons for interstate migration..

(Current population reports: Special studies: Series
P-23; No. 81)

Supt. of Docs. No.: C 3.186:P-23/81

1. Migration, Internal—United States. I. Hansen,
Kristin A., joint author. II. Title. III. Series:
United States. Bureau of the Census. Current population
reports: Special studies: Series P-23; No. 81.
HA203.A218 No. 81 [HB1965] 312'.0973s [301.32'6'0973]

79-607017

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PREFACE

This is another in a series of analytical studies undertaken by demographers in the Population Division, Bureau of the Census. A distinguishing feature of these occasional publications is that they include broad speculative analysis and illustrative hypotheses by the authors as an aid in understanding the statistics and in assessing their potential impact on public policy. The scope of these studies is usually broader than that of annual census reports on population subjects but less complete than book-length monographs.

Previous publications in the Bureau's analytical series include: **Some Recent Changes in American Families**, by Paul C. Glick (1975); **The Geographical Mobility of Americans: An International Comparison**, by Larry H. Long and Celia G. Boertlein (1976); **Marrying, Divorcing, and Living Together in the U.S. Today**, by Paul C. Glick and Arthur J. Norton (1977, published by the Population Reference Bureau, Washington, D.C.); **Racial Succession in Individual Housing Units**, by Larry H. Long and Daphne Spain (1978), and **Interregional Migration of the Poor: Some Recent Changes**, by Larry H. Long (1978). Additional studies are in preparation.

The authors are both members of the Population Analysis Staff of the Bureau's Population Division. Larry Long received the Ph.D. degree in sociology from the University of Texas at Austin in 1969. He joined the Census Bureau in 1970, after spending 1969-70 at the Population Studies Center, the University of Pennsylvania. Kristin Hansen received a B.S. degree in political science from Arizona State University in 1968 and has been with the Census Bureau since then. They have collaborated on earlier studies of interregional migration, including "Trends in Return Migration to the South" (*Demography*, Vol. 12, November 1975), "Interdivisional Primary, Return, and Repeat Migration" (*Review of Public Data Use*, Vol. 5, March 1977), and "Selectivity of Black Return Migration to the South," (*Rural Sociology*, Vol. 42, Fall 1977).

Rudolph Florjancic did the computer programming. The authors would also like to express appreciation to John Long, Diana DeAre, and Arnie Goldstein for their useful comments on earlier versions of this and other manuscripts in the Demographic Analysis series.

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REASONS FOR INTERSTATE MIGRATION JOBS, RETIREMENT, CLIMATE, AND OTHER INFLUENCES

Why people move is a recurring question that has become of special interest in the United States as a result of some unexpected changes in major migration patterns in this decade. In particular, the strong net immigration being experienced by the southern region and the surge in population growth in nonmetropolitan areas in every major region of the country have raised questions about whether the motivations for migration have been changing in recent years. Clearly, large numbers of persons are currently moving to areas where per capita income is relatively low by national standards, where the climate is mild, or where recreational or retirement facilities are present.

These movements seem not to be fully explained by previous theories of the determinants of migration. In the past, migration was often looked upon as the product of alternative economic "pushes" at places of origin and "pulls" at places of destination. Low income or high unemployment at places of origin were thought to be the major determinants of outmigration, with high income or low unemployment being major attracting forces for migrants or potential migrants. But these and related economic indicators have become somewhat less reliable guides to population growth (see especially Beale, 1975). In this context, there is renewed interest in the reasons—especially the noneconomic reasons—for migration. The changed migration patterns could be resulting partly from different values that economically active migrants place on alternative locations and individuals trading income-earning opportunities for amenities in choosing places to live. Changes in migration patterns may also be significantly influenced by retirees and persons with pension income who have considerable freedom of choice in residential location.

One way of identifying the economic and noneconomic reasons for moving is simply to ask people why they moved. This approach was adopted in nationwide surveys conducted by the Census Bureau in 1946 and 1963 (see U.S. Bureau of the Census, 1947; 1966). More recently, questions included as part of the Annual Housing Surveys, conducted by the Census Bureau, have sought to ascertain the main reason for moving for household heads who changed residence in the 12 months preceding the survey. Using this data source, the present study provides an initial analysis of the reported reasons underlying interstate and interregional migration that took place between August 1973 and December 1976.

Analysis of these data is subject to the usual limitations survey research, especially the ability of individuals to articulate the reasons for their behavior. Some other limitations are also present; for instance, only the "main" reason for migrating was recorded. But for studying reasons for moving, the recent

Annual Housing Surveys offer many unique opportunities not present in any other data source. For one thing, the Annual Housing Surveys identified some reasons for moving—notably, “retirement” and “wanted change of climate”—not reported separately in the earlier Census Bureau surveys. Secondly, the large size of the Annual Housing Surveys and the ability to augment their size by cumulating successive annual samples allow more extensive investigation of how reasons for moving vary according to individual characteristics (especially, migrants’ educational level and earnings). Finally, the data allow the first opportunity to disaggregate migrants to and from individual major regions of the country according to reasons for moving.

Limited to the “main” reason for moving and focusing on interstate and interregional migrants, the remainder of this study addresses five related sets of questions.

- Can most interstate moves be attributed to economic considerations, like job transfers and the search for employment? Or do noneconomic motives now rival the search for economic opportunity in accounting for interstate migration?
- How important is climate as a reason for moving? Is it more important for young persons than for older persons? Do the college educated give greater significance to climate than other persons making interstate moves?
- How many interstate migrants are persons moving as result of retirement? What are the age, household type, and income of the typical retiree who relocates to another State?
- In view of the accelerated net immigration to the South in the 1970’s, would the region still have net immigration if we examined only persons moving for strictly job-related reasons? Or, perhaps more simply, how many persons are moving to the South because of climate, in order to retire, or for some other reason that is not directly job-related?
- Are people now more willing to move because of personal preferences (for climate, amenities, etc.)? If so, what are some of the possible implications for public policies aimed at guiding or re-directing economic growth and population distribution?

Source of Data

Data on reasons for moving can be notoriously subjective, so it is important to specify the circumstances under which the data were collected and processed. We used data from the 1974, 1975, and 1976 Annual Housing Surveys conducted by the Census Bureau under an agreement with the Department of Housing and Urban Development. Each of these three national

surveys was based on interviews of occupants of 62,000 to 64,000 housing units throughout the country. Each of the surveys had the same question on reasons for moving, and the three surveys were pooled in order to increase the number of interstate migrants available for analysis. The surveys were taken in the fall of each year (August through October in 1974 and October through December in 1975 and 1976).

For household heads who moved in the 12 months preceding each of the surveys, information was obtained on the location of the previous residence and the reason for the move. The questions on place of previous residence and the reason for the move are reproduced as figure 1.

Without being given a flashcard, the respondent was asked to state the reason for the move. The interviewer was instructed to write each reason on lines provided on the questionnaire, and then to ascertain from the respondent the "main" reason for the move. The "main" reason was indicated by checking one of 30 predetermined reasons (in addition to "other") printed on the questionnaire (see figure 1).

The 30 reasons are not mutually exclusive, and many persons could be expected to cite more than one in answering the question. For example, a person who, when asked the reason for having moved, answered, "When I retired from the Air Force, I moved to Arizona because the weather was warm" would be citing three of the 30 reasons: retirement (reason number 3), leaving the Armed Forces (reason number 2), and desire for a better climate (reason number 30). Or consider a person who said, "When I graduated from college, I moved back to my parents' home while looking for a job." Such a person could be considered as having given two of the 30 reasons: namely, reason number 12 ("Moved to be closer to relatives") and reason number 4 ("new job or looking for work"). Interviewers were instructed to accept whatever the respondent said was the main reason for having moved.

At the present time, there is no way of tabulating how many respondents gave more than one reason or how respondents chose among the reasons given in deciding upon the "main" reason. The 1963 survey of reasons for moving did accept multiple reasons, and of male intercounty movers 18 to 64 years of age, about 15 percent cited more than one reason (U.S. Bureau of the Census, 1966, p. 5). Hence, a sizeable minority of intercounty movers in the earlier survey cited more than one reason for moving, but of those who cited more than one reason, most gave only two reasons. It is important to note, however, that in the 1963 survey multiple reasons were more likely to be given by intercounty movers than by intracounty movers, suggesting that long distance migration is a more complex process that can involve a balancing of competing concerns.

Note also that data on migration and reasons for migration in the Annual Housing Surveys are for the household "head," as defined in the traditional manner employed by the Census Bureau (see, for example, U.S. Bureau of the

Figure 1. Facsimile of Question on Reason for Moving: Annual Housing Surveys of 1974, 1975, and 1976

Section IIIC - OCCUPIED UNITS (Include URE) - Continued	
CHECK ITEM Q	<input type="checkbox"/> URE household (See item 7, page 1) - Skip to 105, page 31 (See Check Item A(3), page 14) <input type="checkbox"/> Head moved here during the last 12 months - Ask 83 <input type="checkbox"/> Head has lived here 12 months or longer - Skip to 102o, page 30
83. What was the address of . . . 's (head) previous residence?	<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Address (Number and street)</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">City or town</div> <div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> County State ZIP code </div> <div style="text-align: center; margin: 10px 0;">OR</div> <div style="display: flex; align-items: center;"> 177 <div> <input type="checkbox"/> Outside the United States - Skip to 102o, page 30 <div style="border: 1px solid black; width: 100px; height: 15px; margin-top: 2px;"></div> </div> </div>
84. What is the main reason . . . (head) moved from his previous residence? (Write all reasons mentioned below, and then mark the main reason.) <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div> <div style="border-bottom: 1px solid black; margin-bottom: 5px;"></div>	<div style="display: flex; align-items: center;"> 178 <div> EMPLOYMENT <input type="checkbox"/> 1 Job transfer <input type="checkbox"/> 2 Entered or left U.S. Armed Forces <input type="checkbox"/> 3 Retirement <input type="checkbox"/> 4 New job or looking for work <input type="checkbox"/> 5 Commuting reasons <input type="checkbox"/> 6 To attend school <input type="checkbox"/> 7 Other </div> </div> <div style="display: flex; align-items: center; margin-top: 10px;"> 178 <div> FAMILY <input type="checkbox"/> 8 Needed larger house or apartment <input type="checkbox"/> 9 Widowed <input type="checkbox"/> 10 Separated <input type="checkbox"/> 11 Divorced <input type="checkbox"/> 12 Moved to be closer to relatives <input type="checkbox"/> 13 Newly married <input type="checkbox"/> 14 Family increased <input type="checkbox"/> 15 Family decreased <input type="checkbox"/> 16 Wanted to establish own household <input type="checkbox"/> 17 Other </div> </div> <div style="display: flex; align-items: center; margin-top: 10px;"> 178 <div> OTHER <input type="checkbox"/> 18 Neighborhood overcrowded <input type="checkbox"/> 19 Change in racial or ethnic composition of neighborhood <input type="checkbox"/> 20 Wanted better neighborhood <input type="checkbox"/> 21 Wanted to own residence <input type="checkbox"/> 22 Lower rent or less expensive house <input type="checkbox"/> 23 Wanted better house <input type="checkbox"/> 24 Displaced by urban renewal, highway construction, or other public activity <input type="checkbox"/> 25 Displaced by private action <input type="checkbox"/> 26 Schools <input type="checkbox"/> 27 Wanted to rent residence <input type="checkbox"/> 28 Wanted residence with more conveniences <input type="checkbox"/> 29 Natural disaster <input type="checkbox"/> 30 Wanted change of climate <input type="checkbox"/> 31 Other </div> </div>

Census, 1978b, Appendix page 19). In husband-wife couples, the husband was considered the "head" of the family for purposes of data collection and tabulation, but automatic designation of the husband as the household head is being discontinued, and in the future the expression "household head" will appear neither on questionnaires nor in publications. We use the word "head" only because the data were collected in terms of the individual designated as the "head" (see figure 1).

Detailed Reasons for Migrating

Counterbalancing some of the shortcomings identified above, an outstanding feature of the new surveys is the detailed list of reasons for moving. The 30 reasons are much more extensive than has been available in the past. Table 1 gives the percent of household heads and the number of persons in those households moving for each of the 30 reasons.

The data confirm previous conclusions (U.S. Bureau of the Census, 1966) that most commonly expressed reasons for interstate migration are job transfers and the taking of a new job or looking for work. As a reason for moving, job transfers accounted for 23.8 percent of interstate migration of household heads and 27.6 percent of total interstate migrants. This reason appears to be somewhat more important for total interstate migrants than for household heads, because the data for total interstate migrants were obtained by applying the reason for moving given by the household head to all persons in that household. Household heads giving "job transfer" as the reason for moving have slightly larger households on the average than all interstate migrants, so "job transfers" account for a slightly larger proportion of persons than of households moving between States. More will be said later about other characteristics of households moving for the various reasons.

Among household heads, the taking of new jobs or looking for work (reason number 4) is about as important as job transfers, accounting for 23.6 percent of interstate moves. Together these two strictly job-related reasons account for slightly more than 47 percent of the interstate migration of households and 51 percent of interstate migration of total persons. In interpreting these results, one can either stress that these two job-related reasons strongly predominate over other reasons for interstate migration, or, alternatively, one can emphasize that they account for less than a majority of households moving between States and barely a majority (51 percent) of total interstate migrants.

We are inclined to emphasize the latter aspect, pointing out that many factors other than employment considerations influence the decision to move or stay. Even taking a more liberal definition of what is an employment-related reason for moving by including reasons 1(job transfer), 2 (entered or left U.S. Armed Forces), 4 (new job or looking for work), and 7 (other employment reason), one still can account for just under 55 percent of the interstate migration of households and 59 percent of interstate migration of persons. Hence, attempts to explain or predict interstate migration solely on the basis of

Table 1. Detailed Reasons for Moving Given by Household Heads Moving Between States in the 12 Months Preceding the 1974, 1975, and 1976 Annual Housing Surveys, According to Number of Households and Total Persons

Detailed reason for move	Percent distribution	
	Households	Persons
EMPLOYMENT		
Job transfer	23.8	27.6
Entered or left U.S. Armed Forces	4.8	4.9
Retirement	3.4	3.0
New job or looking for work	23.6	23.4
Commuting reasons	1.0	0.9
To attend school	5.4	3.9
Other	2.4	2.6
FAMILY		
Needed larger house or apartment	0.8	1.1
Widowed	0.7	0.3
Separated	1.2	1.2
Divorced	1.0	0.8
Moved to be closer to relatives	7.5	7.1
Newly married	1.6	1.4
Family increased	0.1	0.1
Family decreased	0.1	0.1
Wanted to establish own household	1.6	1.2
Other	2.7	2.8
OTHER		
Neighborhood overcrowded	0.4	0.4
Change in racial or ethnic composition of neighborhood	0.2	0.1
Wanted better neighborhood	1.1	1.2
Wanted to own residence	0.9	1.0
Lower rent or less expensive house	0.8	0.8
Wanted a better house	0.3	0.4
Displaced by urban renewal, highway construction, or other public activity	0.1	0.1
Displaced by private action	0.3	0.4
Schools	1.0	0.9
Wanted to rent residence	0.2	0.1
Wanted residence with more conveniences	0.2	0.1
Natural disaster	0.1	0.1
Wanted change of climate	5.1	4.8
Other	5.5	5.4
Not reported	2.1	1.7
Interstate migrants (thousands)	5,843	16,332

economic variables may fail to account for the movements of a sizeable proportion of the population. Furthermore, as discussed in a later section, an important minority of both workers and nonworkers moving between States receive income from transfer payments (notably retirement benefits) which may considerably enhance their locational freedom and reduce the necessity to choose jobs entirely on the basis of wage rates.

Besides job transfers (reason number 1) and taking a new job or looking for work (reason number 4), what other factors help account for interstate migration? According to table 1, the third most important reason for interstate migration of household heads is "moved to be closer to relatives" (reason number 12). Seven and one-half percent of all household heads moving between States in the study period cited this factor as the main reason for their move. This reason probably reflects a great heterogeneity of motivations, for it could include recent college graduates who move back to their parents' home town, recently divorced or separated persons who move to be near relatives, and elderly persons who move in order to live near their grown children. Note, however, that the amount of interstate migration for such reasons is understated in the survey because only household heads were asked about migration and reasons for moving. For example, a widow who moves in with her grown daughter would ordinarily not be considered a household head and therefore would not be asked about mobility status in the Annual Housing Surveys; only if the hypothetical widow maintained a household independent of that of her daughter would she be asked the questions on mobility status. As shown in later sections, the reason "moved to be closer to relatives" is especially important among households headed by women, heads over 55, and heads with less than a high school education.

Aside from the most frequently cited reasons for moving—job transfers, new jobs or looking for work, and moves to be closer to relatives—three reasons each account for about five percent of household heads moving between States. These are "entered or left U.S. Armed Forces" (4.8 percent), "to attend school" (5.4 percent), and "wanted change of climate" (5.1 percent). The role of the military and student migration is understated in these statistics because persons in group quarters, like military barracks and college dormitories, are not covered in the survey. Still, private households headed by military personnel or college students represented about 1 out of every 10 households moving between States during the study period.

In about 1 out of every 20 households moving between States, the desire for a change of climate was the main reason for moving. The desire for a climate change is somewhat more commonly expressed as the main reason for interstate migration than retirement; climate was cited by 5.1 percent of all households moving between States, compared with the 3.4 percent of households moving as a result of retirement. Of the 30 reasons for interstate migration of household heads, climate is certainly among the six most important. This seems like a rather prominent role for a reason that was not recorded (at least not tabulated) in the earlier Census Bureau survey of reasons for moving (U.S. Bureau of the Census, 1966).

This somewhat unanticipated role played by climate as a "main" reason for interstate migration certainly merits fuller investigation, and the next two sections examine the role of climate and the other reasons for moving in accounting for the migration of persons of different ages, different earnings levels, and different educational attainments.

Variability by Age

Many of the reasons for moving examined in the preceding section are probably highly related to a person's age, so in order to get a better picture of why people move, it is important to give the question greater focus by asking, "Why do young persons move?" and "Why do older persons move?"

How some reasons for moving vary with age is obvious: retirement is a phenomenon of older persons (even though the average age of retirement has been falling), and moves to look for work or to change jobs tend to be characteristic of persons just entering the labor force. But the variability of other reasons for moving with age is less obvious. Especially intriguing is the question of whether climate currently plays a more important role in the migration of the young than the old.

On the one hand, one might expect climate to play a more prominent role in the locational decisions of young persons than of older persons. If there have been changes in personal values—less emphasis on the work ethic and more emphasis on life styles and "doing one's own thing" where the weather is nice—one might expect such value shifts to be more characteristic of the young than the old. Furthermore, fewer family obligations may give the young more freedom to move wherever they please, without worrying about finding a job that can support dependent family members as well as themselves.

On the other hand, if financial sacrifices are required in order to give priority to considerations of climate in migration decisions, then middle-aged persons may be in a better position than the young to make a trade-off between income and amenities. Middle-aged household heads typically have been in the labor force for a number of years and have had more opportunity than younger persons to accumulate assets (savings accounts, stocks, etc.) that can provide supplementary income to wages. Hence, middle-aged persons seeking a career change may be more able than the young to accept wage cuts in order to live where the weather is nice.

Table 2 provides a perspective on these competing hypotheses by disaggregating reasons for moving according to broad age groups, sex, and employment status of household heads. In this and subsequent tables, the most commonly cited reasons for moving are shown separately, as in table 1, but we grouped reasons 9, 10, 11, and 13 through 17 into a category labeled "other family reason." Reasons 5, 8, 18 through 29, and 31 were grouped as "all other reasons."

Table 2. Reasons for Moving Given by Household Heads Who Moved Between States in the 12 Months Preceding the 1974, 1975, and 1976 Annual Housing Surveys, by Age, Sex, and Whether the Head Worked in the Week Preceding the Survey

Reasons for moving — total heads and workers	(Numbers in thousands)							
	Both sexes				Male			
	20-34 years old	35-54 years old	55 and over		20-34 years old	35-54 years old	55 and over	Female
ALL HEADS	3,371	1,557	733		2,797	1,339	502	218
					574			231
Percent moving because of:								
Job transfer	25.4	30.9	6.0		28.9	34.0	8.2	11.9
New job or looking for work	28.3	23.2	4.9		29.5	25.0	6.4	11.9
Other employment reason	2.0	3.1	2.6		2.1	3.4	3.2	1.4
Enter or leave Armed Forces	6.3	2.6	—		7.4	2.9	—	0.5
Attend school	7.5	1.2	0.4		7.1	1.0	0.6	—
Wanted change of climate	3.2	5.8	12.1		2.9	6.0	14.1	4.6
Retirement	—	3.3	19.8		—	3.2	25.7	3.7
To be closer to relatives	5.2	5.8	22.2		3.9	5.2	12.7	9.6
Other family reason	8.2	9.4	11.2		6.1	6.6	8.0	29.4
All other reasons	11.2	11.6	17.3		10.3	10.5	17.3	17.4
Not reported	1.7	2.6	3.3		1.8	2.0	3.6	6.0

See footnotes at end of table.

As the table shows, climate is less often cited by the young as the main reason for interstate migration. The percent of interstate migrant household heads citing climate as the main reason for moving rises from 3.2 percent of ages 20 to 34, to 5.8 percent of ages 35 to 54, and then to 12.1 percent at ages 55 and over. The same progression with age is evident when considering only household heads who were employed in the week preceding the survey. As shown in the bottom part of the table, the percent of workers who cited climate as the main reason for moving rises from 2.6 percent at ages 20 to 34 to 5.8 percent at ages 55 and over.

In making these comparisons across age groups, one should bear in mind that interstate migration is most common among the young, with the peak rate among all persons occurring at age 23 (see Long, 1973b). Since interstate migration is concentrated among the young, the number of young interstate migrants moving because of climate exceeds the number of older interstate migrants seeking a climate change. The 3.2 percent of household heads 20 to 34 years old moving between States because of climate represented 107,000 interstate migrants, whereas the 12.1 percent of interstate migrants over 55 moving for this reason represented only 89,000 interstate migrants. Thus, the number of young persons migrating because of climate is greater than the number of old persons migrating for this reason, even though older migrants are more likely to cite climate as the reason for moving.

To get a complete perspective on the relationship between age and migration to seek a climate change, one needs to relate the number of climate-seeking interstate migrants not only to the total number of interstate migrants (as is done in table 2), but also to the total population in the respective age groups. In creating the latter measure, one is asking, "What is the probability that an individual picked at random from the total household heads of a given age group will move to seek a change of climate?" The results indicate that in a year's time about 5 in 1,000 household heads 20 to 34 years old will move between States and report the desire for a change of climate as the main reason for moving; at ages 35 to 54, about 4 in 1,000 will do so; and at ages 55 and over the ratio is about 3 in 1,000. Differences among age groups in this respect are small and difficult to measure precisely even by cumulating samples as we have done, but the results unmistakably show that older persons are not more likely than the young to undertake an interstate move in order to seek a climate change, even though older persons who have moved between States are more likely than the young to report climate as the reason for having moved. This seeming paradox is explained by the fact that for almost all of the specified potential reasons for moving, older persons are less likely to undertake interstate migration than the young.

The importance of climate as the "main" reason for moving is clearly overshadowed by economic reasons for moving, at least at ages under 55. The three economic reasons shown in the table account for 50 to 60 percent of interstate moves of household heads under 55 years old. As expected, "new job or looking for work" appears to be more common at ages under 35 than at ages

35 to 54. Job transfers are the most common reason for interstate migration among household heads 35 to 54 years old. In a general way, the data lend support to the notion, expressed by Lansing and Mueller (1966) and others, that the migration of the young is governed to a considerable extent by the search for employment, whereas the migration of middle-aged workers often represents a search for better employment.

Among heads over 55, moves to be closer to relatives or to retire are the most commonly cited "main" reasons for moving between States. Even among employed persons in this age category, the employment-related reasons for moving play a less prominent role than among younger interstate migrants. About 47 percent of employed household heads 55 years and over moving between States gave one of the three employment-related reasons, compared with 62 percent of employed heads 20 to 34 years old, and 68 percent at ages 35 to 54. The decline in the significance of employment-related reasons at the oldest age group is evident even when we limit consideration to employed male household heads. Clearly, older workers who move between States assign greater significance to various noneconomic considerations than do younger workers.

Especially interesting is the fact that 5 percent of interstate migrant household heads who were 55 or over and employed gave "retirement" as the reason for the move. This seeming anomaly of being both retired and working suggests to us an important mixing of the two activities. Apparently many persons retire from one job (and draw retirement benefits) only to enter a new line of work. In the survey, many of these persons seem to have reported an employment reason rather than retirement as the "main" reason for their move, and indeed, either answer would have been correct. By supplementing retirement benefits with earnings from paid employment, such individuals may have considerable freedom as to where to live, and we will have more to say later about implications for population redistribution.

A final point to note from table 2 is that at every age female household heads—even employed female household heads—are less likely than male heads to cite an employment reason for moving. Among employed household heads between 20 and 34 years of age, the three economic reasons were cited by 66 percent of men and 42 percent of women; somewhat larger differences exist at ages 35 to 54. In general, women workers who head households are less likely than men to report job transfers and more likely to report various family reasons for moving.

Education and Earnings

In investigating why people move, we first refined the question by asking whether young persons (who predominate among interstate migrants) move for different reasons than older persons. An additional refinement of the question can be obtained by asking whether the college-educated move for different reasons than persons with limited educational attainments, or whether the economically well-off move for different reasons than the poor.

Some differences between persons at the educational and economic extremes as to reasons for moving are obvious. But others are less clear, especially as regards various noneconomic reasons for moving. As before, climate—though not dominating among the “main” reasons for moving—may indicate the importance assigned to various amenities, like recreational facilities and the use of leisure time, by persons of different social statuses. Being able to say that climate was the main reason for moving may even indicate the range of choices available to persons who move between States. For example, the well-educated may have more employment opportunities than persons with less education, and as a result the well-educated may be in a better position to pick jobs that fit in with climatic preferences. Hence, the well-educated may be more likely than persons with less formal education to report that climate was the reason for accepting one job rather than another.

To examine these possibilities, we tabulated reasons for moving according to educational level of interstate migrants in table 3, and according to annual earnings in table 4. Both tables incorporate controls for sex and are restricted to persons 20 to 54 years old—ages where labor force participation rates are typically high (although the tables show data separately for all household heads as well as those who worked in the week preceding the survey).

The expectation that well-educated interstate migrants would be more likely to cite climate than the poorly-educated is not supported. Among male interstate migrants, the percent citing climate as the reason for moving fell from 5.7 percent of those with less than a high school education (i.e., less than 12 years of school completed) to 1.9 percent of those with 16 or more years of school (usually implying the completion of a college degree). Even when we limit consideration to employed male interstate migrants, the percent reporting climate as the reason for moving is much lower among those with a college education than among those with less education. Among women the relationship between educational level and likelihood of citing climate as the reason for interstate migration is erratic, but there is no evidence to support the idea that the percent citing climate is highest among those with the highest educational level.

Before dismissing the scenario sketched above, however, one should bear in mind that the likelihood of moving between States is directly related to educational level (Long, 1973a). As a result, the college-educated are greatly overrepresented among interstate migrants. At the 20-to-54 age range, the 2.1 percent of total college graduates (both sexes) who cited climate as the reason for moving represents 38,000 households moving between States for this reason—nearly equal to the number (40,000) of households with heads of less than a high school education moving between States to seek a climate change.

Perhaps the best way to visualize these relationships is to inquire about the possibility that a household will move between States for a given reason (climate, in this case). Among all household heads 20 to 54 years old with less than a high school education (data from U.S. Bureau of the Census, 1977), about 4 in 1,000 will move between States in a year's time and cite climate as

Table 3. Educational Level and Reasons for Moving Given by Household Heads 20 to 54 Years Old Moving Between States in the 12 Months Preceding the 1974, 1975, and 1976 Annual Housing Surveys, According to Sex and Whether the Head Worked in the Week Preceding the Survey

		(Numbers in thousands)				
		Male			Female	
Reasons for moving — totals heads and workers		Less than 12 years of school	12 years of school	13-15 years of school	16 or more years of school	Less than 12 years of school
		558	1,177	834	1,567	143
ALL HEADS						258
						151
						241
Percent moving because of:						
Job transfer		12.0	31.5	30.3	36.6	4.2
New job or looking for work		32.4	21.0	23.4	34.3	5.6
Other employment reason		3.8	2.5	1.9	2.6	0.7
Enter or leave Armed Forces		3.6	9.5	7.8	3.2	—
Attend school		1.1	1.1	7.9	8.0	—
Wanted change of climate		5.7	5.2	4.7	1.9	5.6
Retirement		0.7	1.6	0.8	0.9	1.4
To be closer to relatives		11.8	5.4	2.9	1.7	20.3
Other family reason		10.4	7.8	6.7	3.6	31.5
All other reasons		15.8	12.0	11.5	6.4	26.6
Not reported		2.5	2.5	1.8	1.2	4.2
						2.7
						2.0
						1.7
						12.9
						39.0
						1.7
						—
						2.3
						0.7
						16.6
						10.8
						4.1
						—
						0.8
						14.3
						33.3
						15.5
						2.7
						2.0
						1.7

Table 3. Educational Level and Reasons for Moving Given by Household Heads 20 to 54 Years Old Moving Between States in the 12 Months Preceding the 1974, 1975, and 1976 Annual Housing Surveys, According to Sex and Whether the Head Worked in the Week Preceding the Survey — Continued

(Numbers in thousands)								
	Male			Female				
	Less than 12 years of school	12 years of school	13-15 years of school	16 or more years of school	Less than 12 years of school	12 years of school	13-15 years of school	16 or more years of school
HEADS WHO WORKED LAST WEEK	428	1,052	717	1,366	43	150	104	206
Percent moving because of:								
Job transfer	15.2	35.0	34.9	41.7	(B)	12.7	9.6	14.1
New job or looking for work	36.2	20.9	24.8	37.1	(B)	16.0	19.2	44.2
Other employment reason	4.7	2.0	1.4	2.6	(B)	—	4.8	1.9
Enter or leave Armed Forces	4.0	9.5	7.9	2.9	(B)	2.7	1.0	—
Attend school	0.5	0.9	4.7	3.4	(B)	1.3	15.4	6.8
Wanted change of climate	3.7	5.0	3.3	1.0	(B)	4.7	1.9	4.9
Retirement	—	1.0	0.7	0.1	(B)	—	—	—
To be closer to relatives	9.6	5.0	2.6	1.3	(B)	14.7	5.8	1.9
Other family reason	10.3	7.3	6.8	3.2	(B)	31.3	29.8	9.7
All other reasons	13.6	11.4	11.2	5.3	(B)	13.3	10.6	15.0
Not reported	2.6	2.0	1.5	1.2	(B)	2.7	2.9	1.5

— No sample cases fell in the category or percentage rounds to zero.

B Base is too small to show percentage distributions.

Table 4. Earnings in Last 12 Months and Reasons for Moving Given by Household Heads 20 to 54 Years Old Moving Between States in the 12 Months Preceding the 1974, 1975, and 1976 Annual Housing Surveys, According to Sex and Whether the Head Worked in the Week Preceding the Survey

(Numbers in thousands. Earnings data have been adjusted to reflect 1976 dollars)													
Reasons for moving — total heads and workers	Male					Female							
	Under \$5,000	\$5,000 to \$9,999	\$10,000 to \$14,999	\$15,000 to \$24,999	\$25,000 and over	Under \$5,000	\$5,000 to \$9,999	\$10,000 to \$14,999	\$15,000 to \$24,999	\$25,000 and over			
	924	1,128	964	838	282	440	222	95	31	4			
ALL HEADS													
Percent moving because of:													
Job transfer	8.2	23.2	35.5	48.0	64.2	4.3	10.4	13.7	(B)	(B)			
New job or looking for work	31.4	31.1	26.2	24.1	22.0	14.8	27.0	21.1	(B)	(B)			
Other employment reason	4.0	2.5	1.9	2.0	1.8	0.9	1.8	3.2	(B)	(B)			
Enter or leave Armed Forces	6.0	11.9	3.3	2.3	2.1	7.1	0.5	1.1	(B)	(B)			
Attend school	13.7	3.8	2.6	1.9	0.7	9.5	6.3	3.2	(B)	(B)			
Wanted change of climate	6.8	3.6	2.9	3.2	0.7	4.8	3.6	7.4	(B)	(B)			
Retirement	1.0	0.7	1.0	1.7	0.7	1.8	—	—	(B)	(B)			
To be closer to relatives	5.6	5.1	4.7	2.7	0.7	13.2	9.5	6.3	(B)	(B)			
Other family reason	7.4	5.9	7.8	5.1	2.5	28.4	24.8	20.0	(B)	(B)			
All other reasons	13.3	10.7	10.9	8.4	3.5	18.4	11.7	20.0	(B)	(B)			
Not reported	2.6	1.3	3.1	0.6	0.7	2.7	3.2	1.1	(B)	(B)			

Table 4. Earnings in Last 12 Months and Reasons for Moving Given by Household Heads 20 to 54 Years Old Moving Between States in the 12 Months Preceding the 1974, 1975, and 1976 Annual Housing Surveys, According to Sex and Whether the Head Worked in the Week Preceding the Survey — Continued

(Numbers in thousands. Earnings data have been adjusted to reflect 1976 dollars)

Reasons for moving — total heads and workers	Male						Female					
	Under \$5,000			\$5,000 to \$9,999			Under \$5,000			\$5,000 to \$9,999		
	595	996	908	792	272	198	185	85	29	\$15,000 to \$24,999	\$25,000 and over	4
HEADS WHO WORKED LAST WEEK	595	996	908	792	272	198	185	85	29			
Percent moving because of:												
Job transfer	12.1	26.2	37.6	50.4	66.5	4.0	11.4	15.1	(B)	(B)	(B)	(B)
New job or looking for work	40.2	32.3	26.9	24.4	22.1	24.7	30.8	23.3	(B)	(B)	(B)	(B)
Other employment reason	4.4	2.0	2.0	2.1	1.8	1.0	2.2	3.5	(B)	(B)	(B)	(B)
Enter or leave Armed Forces	8.1	11.8	3.1	2.0	1.5	2.0	—	1.2	(B)	(B)	(B)	(B)
Attend school	8.1	2.1	1.3	1.3	—	11.1	4.9	—	(B)	(B)	(B)	(B)
Wanted change of climate	3.9	3.2	2.8	3.0	0.7	3.5	4.3	7.0	(B)	(B)	(B)	(B)
Retirement	—	0.4	0.7	0.6	—	—	—	—	(B)	(B)	(B)	(B)
To be closer to relatives	4.0	4.6	4.4	2.4	0.7	9.1	9.7	7.0	(B)	(B)	(B)	(B)
Other family reason	6.6	6.2	7.4	5.2	2.6	25.8	21.1	15.1	(B)	(B)	(B)	(B)
All other reasons	11.1	10.0	10.7	8.0	2.9	14.6	11.9	20.9	(B)	(B)	(B)	(B)
Not reported	1.5	1.2	3.3	0.6	0.7	3.0	3.8	1.2	(B)	(B)	(B)	(B)

— No sample cases fell in the category or percentage rounds to zero.

B Base is too small to show percentage distributions

the main reason for the move. Nearly the same proportion—3 in 1,000—of household heads who are college graduates will move between States in a year and cite climate as the main reason for moving. These two proportions are not measurably different, and we conclude that the desire for a change of climate is about as likely to induce interstate migration among high school dropouts as among college graduates in the 20-to-54 age range.

To summarize: the probability of undertaking interstate migration in order to obtain a better climate does not appear to be strongly related to an individual's educational level, but interstate migrants with low levels of educational attainment are more likely than the highly educated to report climate as the reason for having moved. This seeming paradox simply reflects the fact that the highly educated are much more likely to move between States, usually for some economic reason. From table 3, observe that job transfers were cited by nearly 37 percent of male college graduates moving between States, compared with only 12 percent for men with less than a high school education. Rather clearly, their employment in jobs that permit (or require) job transfers is a major factor accounting for the higher interstate migration rates of college graduates.

But the interplay between educational level and the role of noneconomic factors like climate can be very complex. Many college graduates may reject job transfers to places where the weather is bad or where their favorite leisure activity cannot easily be pursued, only to accept a later transfer to a place where the climate is mild and then to report "job transfer" as the reason for moving. Furthermore, because they move between States more frequently, college graduates may sometimes be willing to accept a job in a place they do not like, with the expectation that a better (or equally good) job will shortly come along in a location offering a better climate. Persons with only a high school education expect far fewer lifetime moves (see Long, 1973a) and may not have such options.

Of course, there is always the possibility that high incomes among the highly-educated may reduce the need to migrate in order to enjoy the attractions of particular locations. For example, high-income persons who like to ski may be able to afford week-end airplane trips to Colorado without having to live in Colorado. And being able to afford a condominium in Florida may reduce the need to migrate to Florida in order to enjoy warm weather. Second homes in other locations—along rivers, at the beach, in the mountains—may allow part-year residences where recreational facilities are present and may reduce the need to migrate to such places on a permanent basis. Extensive recreational developments built around second homes owned by the well-to-do probably tend to generate employment opportunities in construction and service industries, and these jobs—many of which are not high-paying—may facilitate the movement of lower-income persons to such developments. Hence, some recreational developments could conceivably reduce the need of the well-to-do to migrate to amenity-rich locations while encouraging the migration of persons of more modest economic means to such areas.

This general perspective is perhaps supported by noting the infrequency with which persons of high earnings cite noneconomic reasons for moving (see table 4). Only 0.7 percent of men with annual earnings in excess of \$25,000 cited climate as the reason for moving between States. Family reasons were also cited infrequently among persons at this earnings level. Fully 64 percent of men who had earnings over \$25,000 and who moved between States reported that a job transfer was the reason for moving.

The resulting sketch of who moves and why is one that emphasizes the overall higher migration rates of well-educated persons. Such individuals overwhelmingly report job-related reasons (especially job transfers) as the main reason for moving, although for many, noneconomic factors may play an important but unmeasured role in influencing the timing of the move and the choice of destination. Persons with low levels of education or earnings are more likely to report noneconomic reasons, especially family considerations but also climate, in explaining why they moved

Retirees

In order to statistically portray the different types of interstate migrants, we decided to present summary characteristics of households moving for each of the major reasons. This approach can be a graphic way of contrasting the age, income, and composition of the typical household moving to seek a change of climate, because job transfer, etc. The last change we made in designing the tabulation for this purpose was to add a line to show the proportion of interstate migrant households receiving pension income. This last-minute change produced what turned out to be the most interesting aspect of the tabulation shown as table 5.

Fully 20 percent of households moving between States were found to be receiving pension income. In this case, "pension income" means that at least one person in the household reported income in the preceding 12 months from at least one of three sources indicated on the questionnaire: social security or Railroad Retirement payments, government employee pensions, or private pensions or annuities. The questionnaire had separate lines for 9 other types of income for each household member (for a facsimile of the 1976 questionnaire, see U.S. Bureau of the Census, 1978b, Appendix pages 38 and 39).

Of course, not all persons receiving such income are retirees, because social security sometimes goes to the children of decedents. But most persons with these types of income are retirees, and almost all have enhanced freedom of choice as to where to live. The 20 percent of households with income of this type represents in excess of 3,000,000 interstate migrants during the 3-year period of study. Clearly, the migration of so many persons can have a substantial impact on population redistribution.

The 20 percent of households moving between States that have pension income contrasts sharply with the 3.0 percent of households reporting

Table 5. Summary Characteristics of Households Moving Between States for Specified Reasons in the 12 Months Preceding the 1974, 1975, and 1976 Annual Housing Surveys

Summary characteristics	All reasons	Job transfer	New job or looking for work	Other employment reason	Wanted change of climate	Moved to be closer to relatives	Other family reason	Retirement
Total migrant households (thousands)	5,843	1,392	1,378	140	296	437	532	197
Mean household size	2.8	3.2	2.8	3.1	2.6	2.7	2.4	2.5
Median age of head	31	32	29	33	42	40	31	61
Percent of heads with college, 4 years or more	33.0	44.5	46.6	32.6	18.5	10.5	13.6	25.9
Percent of households with children under 6	28.1	36.8	30.5	29.7	15.9	25.3	21.5	2.6
Percent of households headed by women	18.2	5.6	12.1	9.7	20.4	42.6	47.0	12.1
Husband-wife couples as a percent of all households	64.4	82.3	66.0	73.1	56.0	49.6	38.5	82.7
Percent going to a nonmetropolitan destination	33.3	28.9	34.2	35.6	31.2	40.4	33.0	54.2
Percent of heads with a job last week	75.0	98.1	90.7	77.8	49.3	45.9	60.7	11.8
Percent of households with more than one earner	34.3	39.8	39.0	31.6	33.5	23.2	25.1	23.7
Median income of household in last 12 months (1976 dollars)	11,460	16,527	11,520	13,650	9,767	7,576	7,738	11,899
Median earnings of head in last 12 months (1976 dollars)	7,954	13,654	8,415	7,891	3,765	2,529	4,685	983
Percent of households with income from pensions or annuities	20.4	7.9	10.8	13.1	39.0	43.0	26.6	82.8

"retirement" as the reason for moving (refer back to table 1). Thus, the data on reasons for moving substantially understate the number of retirees among interstate migrants. Among interstate migrants, the number of households with retirement income may be six times as large as the number of households that reported retirement as the reason for moving.

One reason for the "understatement" of retirement as a reason for moving can be found by looking at the employment status of household heads for whom retirement was cited as the reason for moving. In table 5 observe that nearly 12 percent of "retired" household heads who moved between States were working in the week preceding the survey. More of the non-working retirees are likely to become employed at a later date, after they have had more time to look for work in the area of destination.

Another indicator of the mixing of retirement and working can be found by noting that pension income was reported by nearly 8 percent of household heads giving "job transfer" as the reason for moving, and nearly 11 percent of heads who moved to take a new job or look for work reported pension income. These data suggest to us that many persons who leave a job and draw retirement benefits use the occasion to enter a new line of work. Such persons may look upon the transition not as retirement, but as an opportunity for a career change, and when they move, many report an employment reason rather than retirement.

Because they do not need to rely on a job for complete economic support, retirees who want to supplement their pension benefits by working have more options as to where to live than other workers. Many persons with pension income may be willing to work part-time or to rely on seasonal employment, and many are willing to forego various fringe benefits (like generous retirement plans) that would be an important consideration for younger workers. In general, persons with pension income do not have to look for jobs that pay enough to support a family because they do not need to support a family through current earnings. The potential impact of households with what we defined as pension income can be gauged by recalling that more than 3,000,000 of the 16,332,000 interstate migrants during the study period belonged to households that had some income from pensions.

Many of these persons can give a high priority to climate or amenities in choosing where to move. From table 5, observe that fully 39 percent of persons citing climate as the main reason for their move also reported income from pensions. About 9 percent of persons moving for one of the three employment reasons reported income from pensions and, presumably, were in a better position than others moving for employment reasons to emphasize noneconomic considerations in making their migration decision.

Most of those who said that retirement was the reason for moving had pension income. It is a little surprising to find that because of pensions and sources of income other than earnings, persons reporting retirement as the

main reason for moving have a total household income equal to (or slightly greater than) the average for all households moving between States. Note from table 5 that of all households moving between States the median annual household income (in 1976 dollars) was \$11,460, compared with \$11,899 for retirees. But the median annual earnings of heads reporting retirement as the reason for moving was only \$983, suggesting that most of the difference was due to pension income. This total income level is not very much different from that for all families and unrelated individuals in 1976 (see U.S. Bureau of the Census, 1978, p. 2). Thus, households reporting retirement as the reason for interstate migration are by no means a low-income group, on the average, even though many undoubtedly are moving to areas where living costs are low and where a fixed income can be stretched.

The "typical" household reporting retirement as the reason for moving between States seems to consist of a husband-wife couple in which the husband is around 61 years old, and more often than not, the interstate move is to a nonmetropolitan destination. Over 54 percent of all interstate migrant households moving to retire went to a nonmetropolitan location, possibly because of lower living costs or the presence of recreation or other amenities. Among all interstate migrant households, only 33 percent went to a nonmetropolitan destination, and even among persons reporting climate as the reason for moving, only 31 percent went to a nonmetropolitan location. Clearly, retirement households moving between States have a strong preference for nonmetropolitan residence.

Table 5 is also useful for sketching "profiles" of other groups of interstate migrants. For example, household heads who said climate was the main reason for having moved tend to be older than average (42 years old versus 33 for all household heads moving between States), to have low levels of education and earnings, and to report not having had a job in the week before the survey. This picture generally corresponds with the conclusion from tables 3 and 4 that persons of low socioeconomic status were more likely than high-status migrants to report climate as the main reason for moving.

Of the major migrant groups, households reporting job transfers tend to be of the highest socioeconomic status. Their high median household income (\$16,527 versus \$11,460 for all households moving between States) results largely from the head's high earnings. Most transferees are married and living with their spouse, as evidenced by the fact that 82 percent of transferred households were husband-wife couples. Transferees have a high level of educational attainment and usually move to or between metropolitan areas.

Regional Flows

The surveys also permit investigation of why people report moving to or from the major regions of the country. Interest in this type of question has been growing considerably as the volume of net immigration to the southern region has increased greatly in the 1970's, while the northern regions have

registered decreased attractiveness both to residents and to migrants. Data on reasons for moving allow one way of identifying the types of migrants going to and leaving the various regions of the country. Why people said they moved to or from each of the four major regions during the study period is reported in table 6. The four regions are defined according to common practice used by the Census Bureau, with the South extending roughly from Delaware to Texas. Many Bureau publications include maps of the four major regions (e.g., U.S. Bureau of the Census, 1978b, p. vii).

Some of the most striking regional migration changes have involved the South—historically a low-income region—shifting from net outmigration in the 1950's to moderate net immigration in the 1960's and then to substantial net immigration in the 1970's (for a chart of the South's net migration from 1880 to 1975, see Long, 1978). The growing volume of net immigration to the South has gradually encompassed more and more population groups, and the region now has net immigration of young and old persons (U.S. Bureau of the Census, 1978a), of Blacks and Whites (U.S. Bureau of the Census, 1978d), and of poor as well as nonpoor persons (Long, 1978).

Many unanswered questions have revolved around speculation concerning the number of persons moving to the region to retire or because of climate. Many retirees may move to the South to established retirement communities in Florida or simply to nonmetropolitan areas where low living costs can help stretch a pension. Also, because of heavy outmigration in earlier decades, there are many southern-born persons living in other regions and nearing retirement age. Many may want to go home and return to communities left long ago. The representation of retirees and climate-seekers among migrants to the South has not been previously established.

During the 1973-76 study period, both groups contributed to the South's net immigration. During the period, about 134,000 persons moving to the South were in households where the head reported retirement as the reason for moving, and another 275,000 immigrants were in households where the head said that the main reason for moving was to seek a better climate. These two groups represented 4.1 percent and 8.5 percent, respectively, of all migrants to the South during the study period. Of course, the South had net immigration of both groups, but what is more interesting is that the number of retirees and climate-seekers going to the South appears to exceed the number moving to the West for these reasons. In other words, for these two groups of migrants, the South appears to be more attractive than the West.

For the Northeast and North Central regions, climate and retirement help account for outmigration. For about 11 percent of the persons leaving the Northeast and nearly 10 percent of the persons leaving the North Central region, the desire for a change of climate was the main reason for moving. For both regions, an additional 4 percent of outmigrants were retirees.

Table 6. Persons Moving to and from Each Region in the 12 Months Preceding the 1974, 1975, and 1976 Annual Housing Surveys, According to Reason for Moving Given by the Household Head

Reasons for moving	(Numbers in thousands)							
	To Northeast	From Northeast	To North Central	From North Central	To South	From South	To West	From West
Number of migrants	1,058	1,829	1,935	2,400	3,254	2,407	2,106	1,718
Job transfer	328	468	510	571	832	728	587	490
New job or looking for work	251	365	513	585	678	532	428	388
Other employment reason	22	34	58	74	125	63	43	78
Enter or leave Armed Forces	82	80	141	111	165	165	109	141
Attend school	40	86	108	51	68	118	92	54
Wanted change of climate	28	201	26	238	275	81	223	32
Retirement	26	71	37	106	134	74	93	39
To be closer to relatives	72	113	159	226	304	212	153	137
Other family reason	77	127	154	144	256	167	103	152
All other reasons	95	250	197	265	373	225	244	169
Not reported	37	34	32	29	44	42	31	38

Table 6. Persons Moving to and from Each Region in the 12 Months Preceding the 1974, 1975, and 1976 Annual Housing Surveys, According to Reason for Moving Given by the Household Head — Continued

(Numbers in thousands)

Reasons for moving	To Northeast	From Northeast	To North Central	From North Central	To South	From South	To West	From West
Percent distribution	100.1	100.2	100.1	99.9	100.1	99.9	100.1	99.9
Job transfer	31.0	25.6	26.4	23.8	25.6	30.2	27.9	28.5
New job or looking for work	23.7	20.0	26.5	24.4	20.8	22.1	20.3	22.6
Other employment reason	2.1	1.9	3.0	3.1	3.8	2.6	2.0	4.5
Enter or leave Armed Forces	7.8	4.4	7.3	4.6	5.1	6.9	5.2	8.2
Attend school	3.8	4.7	5.6	2.1	2.1	4.9	4.4	3.1
Wanted change of climate	2.6	11.0	1.3	9.9	8.5	3.4	10.6	1.9
Retirement	2.5	3.9	1.9	4.4	4.1	3.1	4.4	2.3
To be closer to relatives	6.8	6.2	8.2	9.4	9.3	8.8	7.3	8.0
Other family reason	7.3	6.9	8.0	6.0	7.9	6.9	4.9	8.8
All other reasons	9.0	13.7	10.2	11.0	11.5	9.3	11.6	9.8
Not reported	3.5	1.9	1.7	1.2	1.4	1.7	1.5	2.2

But for every region, the most commonly cited reasons for moving were either (1) a job transfer or (2) a new job or the search for employment. Together, these two reasons accounted for 46 to 55 percent of in- or outmigrants for the four regions. These two reasons were least commonly cited by migrants from the Northeast or North Central regions or to the South or West, reflecting the fact that in these migration streams various noneconomic factors (climate, retirement, etc.) assumed a more important role than in other regional streams.

It is interesting to note that the South and West have net immigration and the Northeast and North Central regions have net outmigration for most of the reasons for moving shown in the table. Some exceptions exist, but, generally, the South and West have net immigration of persons moving for economic reasons, in addition to having net immigration among persons moving in order to retire, to seek a climate change, or to be closer to relatives. In contrast, the Northeast and North Central regions have net outmigration of persons moving for each of these reasons. These data underscore the broad base of migration gains being experienced by the South and West and the losses being experienced by the northern regions.

Have Reasons for Moving Changed?

As mentioned earlier, the Census Bureau on three occasions has asked national samples of the population to report the reason or reasons for having changed residence in the preceding 12 months. Such inquiries were included in Current Population Surveys in 1946 and 1963 and in Annual Housing Surveys taken since 1973. With one or two exceptions, the data from these sources constitute the only nationwide statistics on self-reported reasons for moving.

On all three occasions, the tabulated results of the surveys revealed that job transfers and moves to look for work or to take a new job were the most commonly cited reasons for long-distance migration, although moves to be near relatives were also frequently mentioned. Apart from this rather vague generalization, we do not think that the three data sources provide a basis for inferring either change or stability in self-reported reasons for moving. This frustrating lack of comparability derives primarily from the fact that the 1946 and 1963 surveys used open-ended questions and accepted more than one reason for moving, whereas the 1973-76 surveys used 30 pre-listed reasons and recorded only the respondent's identification of the "main" reason. Shryock (1969) gives some examples of diverse practices that have prevented other comparisons of studies of reasons for moving.

The prevailing opinion seems to be that the reasons or motivations for migration have been changing, with greater emphasis nowadays being given to noneconomic factors and quality-of-life considerations (for some examples, see Zelinsky, 1974; Beale, 1975; and Svart, 1976). Some demographic trends in the general population—like the aging of the baby boom children into the

young-adult ages where migration propensity is greatest, the growing proportion of families supported by women, and a rising level of education—would be expected to affect the composition of interstate migrants and, by inference, the reasons for moving. For example, a rising level of education and a growing concentration of population at the 20 to 30 year old age group (the baby boom cohorts) would tend, other things being equal, to raise the number of job-related reasons for long-distance migration, because being young and having a high level of education were found in previous sections to be positively associated with the likelihood of citing a job-related reason as the main reason for moving between States. A growing proportion of interstate migrant households supported solely by women would tend to offset this effect to some extent.

But apart from these broad demographic trends, there are other changes which, although they may not be changing the “main” or “primary” reason for moving, probably allow individuals to give greater weight to secondary (mostly noneconomic) factors in the decision to move or the choice of destination. One such group is retirees, for those with pensions large enough to provide complete economic support can live almost anywhere they want to. Even more numerous may be individuals who draw retirement benefits at an early age but because of preference or necessity mix retirement with paid employment (whether full-time, part-time, or part-year). Such individuals are typically not well identified in surveys, but their number is surely growing, and they show a pronounced preference for Southern and nonmetropolitan destinations.

Their numbers are likely to increase simply because the ratio of retirement benefits to pre-retirement income is rising in the United States (see Hannes-Olsen, 1978), meaning that the financial sacrifice associated with retirement is falling, and implying that more persons will choose some form of retirement or semi-retirement over full-time employment. One implication is that econometric models of migration may have less and less success in forecasting population flows on the basis of economic variables. Retirees and part-time workers probably constitute a rising proportion of migrants who are not looking for a full-time job that maximizes earnings (an important focus of many past attempts to model migration flows).

Their effect on population distribution and redistribution may be greater than their numbers alone would imply, for the movements of retirees, semi-retirees, and part-time workers create employment for others who are seeking to maximize earnings. Taking into account these multiplier effects in making regional population projections will require further research and evaluation of alternative simulation models.

Some Policy Considerations

As to the last of the five major questions posed at the beginning of this study, we have already suggested that a rising proportion of movers and potential movers are freer to give enhanced importance to personal preferences

in choosing where to live. Retirees, whose numbers have been increasing as the average age at retirement has fallen, certainly are included in this group, and their migration patterns currently show a pronounced preference for non-metropolitan locations or areas with scenic or recreational attributes.

But others, too, may be more able now than in the past to assign high priority to environmental qualities in deciding where to live. For example, smaller families (the product of falling fertility) and the rise of single-person and non-family households may allow greater freedom of movement, because large family size and the presence of school-age children impeded migration in the past (Long, 1972). Furthermore, although working wives may sometimes reduce the readiness of their husbands to accept job transfers (Long, 1973), in other cases working wives may give their husbands greater opportunities to choose jobs according to criteria other than earnings maximization, as was often the case in the past when the husband's job had to support a dependent wife and children. Some two-earner households may choose to live in the most attractive location where at least one acceptable job can be found, with the working spouse's earnings used to support the job search of the other spouse.

Enhanced locational freedom implies a rise in the degree to which jobs follow people, as opposed to the somewhat more traditional process whereby the creation of jobs more clearly preceded the movements of individuals. But beyond this implication, which is reflected in the growing service sector, there are two other implications which may be especially relevant to policy making:

- Jobs alone may not be enough to attract immigrants and insure growth. A location that is environmentally unattractive may have difficulty attracting new residents in spite of job-creation programs.
- The preservation of amenities in the process of economic growth may become more important in sustaining economic growth in individual localities. That is, a meshing of economic growth and the goals of environmental preservation may become not only useful but necessary in retaining population and attracting new residents to an area.

Regarding the first point, growth-center strategies may have to take into account many more factors than in the past, including opportunities for recreation and individuals' locational preferences. Past growth-center strategies have stressed the role of economic factors in accounting for growth and reasons for moving, and they have generally sought to direct migration away from the largest metropolitan centers and toward medium-sized places. Future growth-center policies might increase their effectiveness by combining job-creation programs with programs that develop or enhance recreational opportunities. The most successful programs may be those that can mix moderate industrial growth with employment spin-offs from nearby recreational areas.

If environmental amenities have become more important in influencing where people live, then preservation of locational attractiveness may be of

greater significance in retaining population and even preserving growth. Unregulated strip mining or overdevelopment of land in scenic areas are two obvious examples of projects that might create jobs in the short run but impair the long-term attractiveness of an area as a growth center. The prospect of continued growth in leisure time, greater locational freedom for larger numbers of persons, and a preference for dispersed living patterns suggests greater emphasis on quality-of-life concerns in reasons for staying as well as reasons for moving. In this context, the preservation of environmental qualities that initially attract new residents may become part of a strategy to sustain moderate growth.

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A Methodological
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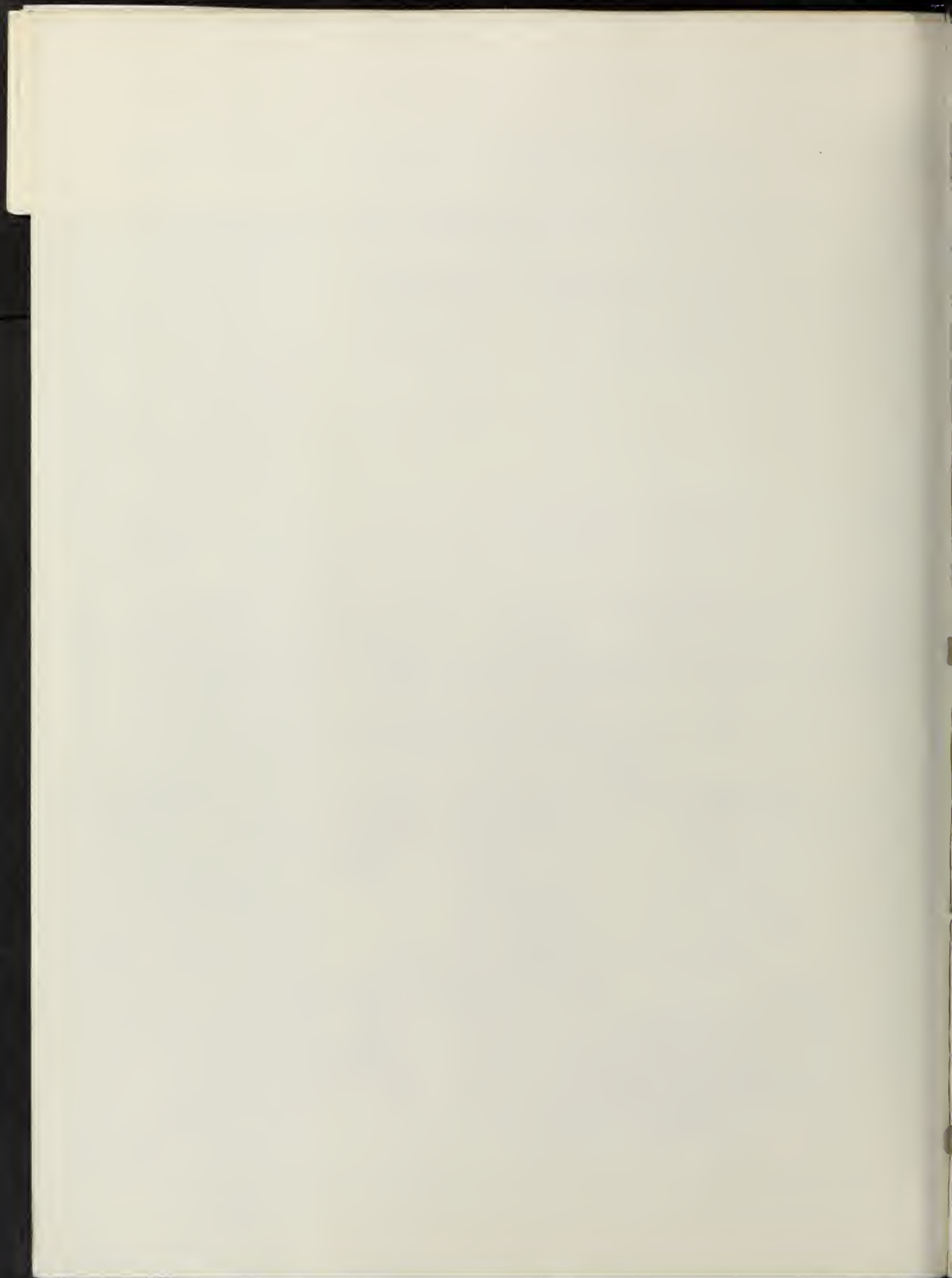
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by Jacob S. Siegel
and
Jeffrey S. Passel



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Library of Congress Cataloging in Publication Data

Siegel, Jacob S.

Coverage of the Hispanic population of the
United States in the 1970 census.

(Current population reports : Special studies :
Series P-23 ; no. 82)

1. Hispanic Americans—Statistics.

2. United States—Census, 19th, 1970.

I. Passel, Jeffrey S., joint author. II. United

States. Bureau of the Census. III. Title.

IV. Series: United States. Bureau of the
Census. Current population reports : Special
studies : Series P-23 ; no. 82.

HA203.A218 no. 82 [E184.S75] 312'.0973s
[312'.93] 79-18517

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Preface

As part of its continuing effort to measure and report on the quality of census data, particularly the coverage of major segments of the population, the Census Bureau initiated a study to consider the possibilities of measuring the coverage of the Hispanic population in the 1970 census, at least at the national level. Such a study would complement a previous study which presented measures of the coverage of the White and the Black populations of the United States in the 1970 census. It was recognized early that a study of the kind contemplated would necessarily be exploratory in nature since the lack of comprehensive data on the Hispanic population and the use of various census concepts to identify the Hispanic population would hamper the efforts to arrive at adequate measures of coverage, if not preclude that possibility altogether. In spite of the evident difficulties, the Census Bureau undertook to review the problems and possible methods of evaluating the census count of the Hispanic population and to apply such methods as seemed feasible.

This report represents the results of this effort. It reflects also the Census Bureau's interest in filling the request of the Census Advisory Committee on the Spanish-Origin Population for the 1980 Census and in filling the requirements of Public Law 94-311 (a Joint Resolution of the Congress relating to publication of statistics for the Spanish-origin population), to explore various methods which could be used to produce adequate estimates of the census coverage of the Hispanic population.

This report applies the method of demographic analysis to evaluate the general quality of the data on the Hispanic population in the 1970 census, as well as to measure the coverage of specific age-sex groups. A detailed description of the methods employed in developing the various estimates, including a description of the data and the assumptions incorporated into the methods, is given.

This report supplements two earlier Census Bureau publications presenting estimates of coverage of the population in the 1970 census: "Estimates of Coverage of Population by Sex, Race, and Age: Demographic Analysis," Evaluation and Research Program of the 1970 Census of Population and Housing, PHC(E)-4, February 1974; and "Developmental Estimates of the Coverage of the Population of States in the 1970 Census: Demographic Analysis," *Current Population Reports*, Series P-23, No. 65, December 1977. The first report presents estimates of the completeness of coverage of the population of the United States as a whole in the 1970 census, for age, sex, and race (White, Black) categories, developed by the method of demographic analysis. The second report presents several alternative series of estimates of the coverage of the population of States in the 1970 census, representing the results of an exploratory effort to apply the demographic method for measuring geographic variations in coverage.

Jacob S. Siegel, Senior Statistician for Demographic Research and Analysis, Population Division, and Jeffrey S. Passel, Demographic Statistician on the Research and Analysis Staff of the Population Division, are responsible for the preparation of this report and the research underlying it. Siegel initiated and directed the study, while Passel designed the particular calculations and prepared the basic draft of the text. Janet Kalwat served as a professional assistant on the project during a summer internship. Rita A. Daly and Gary D. Smith assisted the professional staff in carrying out the various calculations. Mary J. Kisner typed the various drafts of the report with the assistance of Joan M. Kans.

The provisional draft of the report was made available for comment in advance of publication to several social scientists with special knowledge and interest in the areas of census evaluation and Hispanic statistics, namely Harley Browning, Leobardo Estrada, David C. Heer, Guillermina Jasso, and Julian Samora. The authors wish to thank those who responded to the request for comments.

The Bureau of the Census would also like to thank the Census Advisory Committee on Population Statistics, the Census Advisory Committee on the Spanish-Origin Population for the 1980 Census, the General Government Division of the U.S. General Accounting Office, and the Subcommittee on Census and Population of the Committee on Post Office and Civil Service, U.S. House of Representatives, for encouraging the Bureau to continue its research on the subject treated here and to prepare an appropriate report. The Bureau of the Census is wholly responsible, however, for the contents of this report, including the analyses and interpretations as well as the selection of materials.

This report has raised a number of unresolved problems and has, in effect, been essentially exploratory. Readers' comments and suggestions regarding its contents and possible approaches to the problems raised are invited.

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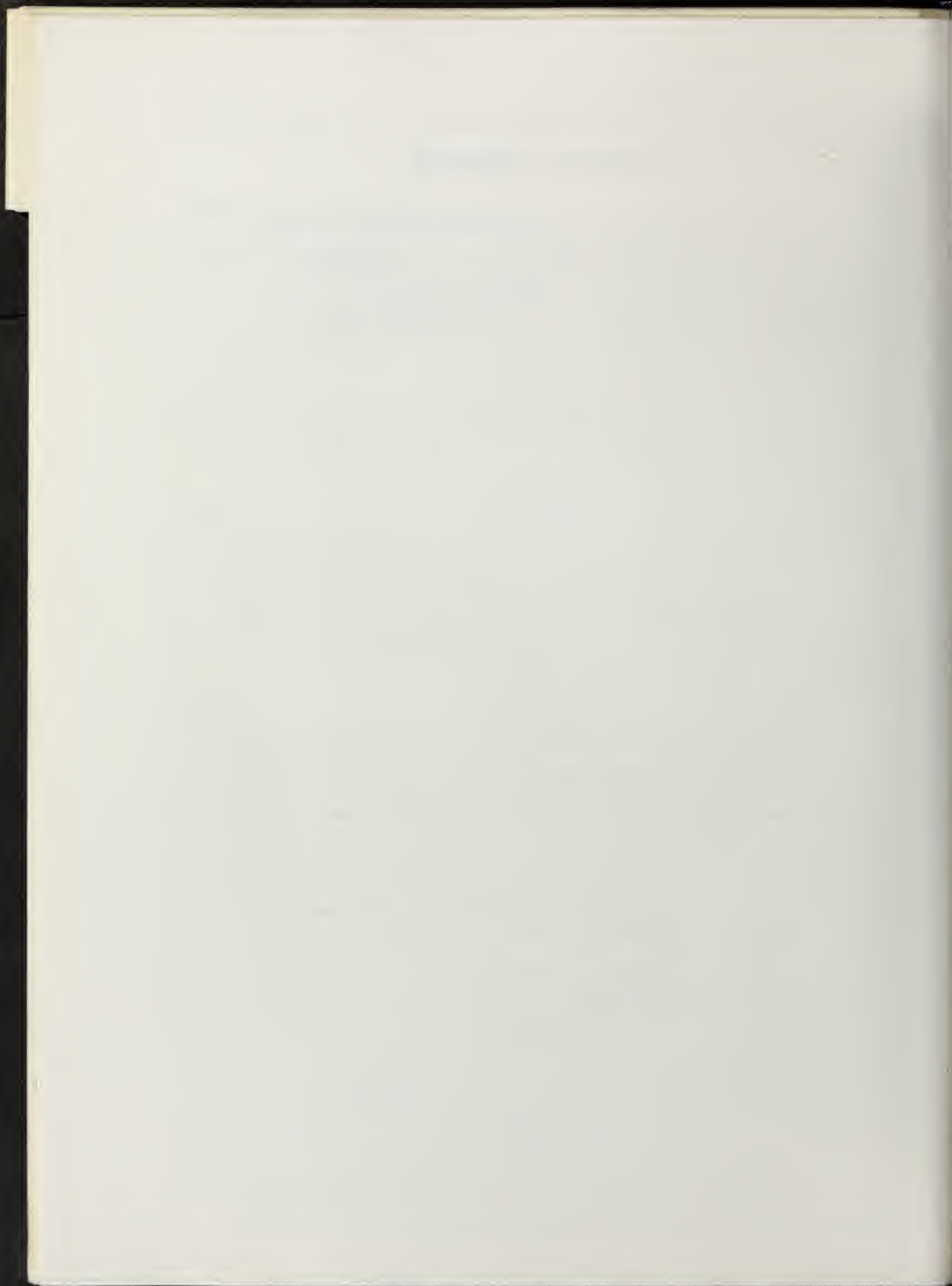
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Introduction and Summary

INTRODUCTION

Much interest has been expressed in an estimate of the coverage of the Hispanic population of the United States in the 1970 census, both for its own sake and for its value in measuring the coverage of the population in specific areas.¹ The Bureau of the Census had considered the feasibility of developing an estimate of the completeness of coverage of the Hispanic population in the 1970 census in connection with its studies of the coverage of the White and Black populations in that census. Estimates of coverage were prepared and published for the total, White, and Black populations (with age and sex detail),² but an estimate of the coverage of the Hispanic population could not be prepared at the same time because of the lack of appropriate data and an acceptable methodology. This difficulty was complicated by the lack of a consistent and definitive identifier for the Hispanic population. In this report, these obstacles to the estimation of the coverage of the Hispanic population in the 1970 census are explored more fully and possible strategies for overcoming the obstacles are discussed.

Any estimate of "coverage" (net census error) for a particular subgroup of the total population, such as the Hispanic population, may be viewed as consisting of two components: net coverage error and net classification error. With reference to the Hispanic population, net coverage error is the excess of persons of Spanish ancestry omitted from the census over persons of Spanish ancestry counted twice or erroneously included in the census. Net classification error is the balance of persons erroneously classified as of non-Spanish ancestry and persons erroneously classified as of Spanish ancestry. Determining the combined error or the separate components for the Hispanic population is a major problem. In the 1970 census, which relied largely on self-administered questionnaires and self-identification of

ethnic affiliation, the measurement of classification error is especially problematic. Such errors may arise from a number of sources. They may result from misinterpretation of the question on ethnic affiliation on the part of the respondent or enumerator, misreporting of ethnic affiliation by the respondent (e.g., born in Cuba, but reporting "not Hispanic"), or processing errors. They may also be associated with inconsistent application of the various definitions of the Hispanic population on the part of the respondent or enumerator or variability in response to the same identifier.

The estimation of net census error rates for any population group requires adequate data for the construction of an "expected" population, with which the census figures can be compared, or reinterview or administrative records covering all or most of the population, with which the census records can be matched. Most of the data available on the Hispanic population come from the decennial censuses or the Current Population Survey (CPS), the Census Bureau's continuing national sample of the population. A small part of the data comes from State and local sources; these data are generally limited to the corresponding geographic areas and to recent years. Administrative record data in which members of the Hispanic population are identified are rare. Where they exist, restricted geographic coverage and population coverage limit their utility for evaluating census data.

Evaluation of the coverage of the Hispanic population in 1970 is complicated in particular by the fact that there may have been a substantial (but unknown) number of illegal residents of Hispanic origin in the United States at that time. Accordingly, some of the "findings" presented here regarding the coverage of the Hispanic population and, in particular, of the population of Mexican origin must be qualified by the fact that no direct allowance was made in the analysis for illegal immigration prior to 1970.

This report includes (1) a discussion of the principal methods that can be used to evaluate population coverage in the 1970 census and the general advantages and limitations of each for the evaluation of the coverage of the Hispanic population, (2) a survey of the census data available on the Hispanic population to be evaluated, (3) a discussion of the implications of the alternative definitions of the Hispanic population in the census for coverage evaluation, (4) a survey of the demographic and administrative record data available

¹ The term "Hispanic" is employed here as a general term for the population of Spanish background or ancestry, and is used variously to encompass any of the several specific concepts which have been used to identify this group on the basis of specific questions or measures and which are quantitatively represented in Bureau of the Census tabulations. The term does not, therefore, have any specific statistical or numerical connotation.

² U.S. Bureau of the Census, 1970 Census of Population and Housing: Evaluation and Research Program, PHC(E)-4, *Estimates of Coverage of Population by Sex, Race, and Age: Demographic Analysis*, 1974.

on the Hispanic population useful for evaluating coverage, (5) a description of the specific procedures of demographic analysis employed here to evaluate the accuracy of the 1970 census data on the Hispanic population and a discussion of the illustrative results, and (6) consideration of possible alternative approaches and possibilities for 1980 and beyond.

SUMMARY

The methods available for estimating the coverage of a population group such as the Hispanic population may be grouped under three general categories: case-by-case matching (employing reinterview surveys or record checks), demographic methods, and statistical methods. The possible application of these methods is explored in this report. The applicability of these methods to the Hispanic population is dependent on the availability of appropriate data from census and other sources. Our present belief is that, of the methods discussed, a national reinterview survey designed for the specific purpose at hand, supplemented by a check against administrative records, could possibly provide the most satisfactory direct information on the coverage of the Hispanic population. Such a survey was not conducted following the 1970 census, however, partly because funding was not available for such an activity at that time. Other survey data and demographic analysis provide the basis for the present exploratory efforts to measure coverage of the Hispanic population in the 1970 census.

Attempts to measure net census error in 1970 for the Hispanic population were severely limited by two problems: the variability of response to the several classifiers or identifiers and the paucity of appropriate data. A central problem is the inability of the census data to reflect a clear, unambiguous, and objective definition of exactly who is a member of the Hispanic population. The Census Bureau has tried several different ways of identifying the Hispanic population in past censuses, but each identifier presents serious problems for use in measuring the national coverage of the Hispanic population. In 1970, four different identifiers of the Hispanic population were used: Spanish origin or descent, Spanish surname (five States only), Spanish mother tongue, and Spanish birth or parentage. These identifiers were then used to define six different populations: Spanish origin or descent, Spanish surname (five States only), Spanish language, Spanish heritage, Spanish language or surname, and Spanish birth or parentage. The primary difficulty with most of these identifiers and classifiers is the amount of variation in response associated with them. It is possible, in fact, that the differences between the counts of the Hispanic population according to the various identifiers and classifiers are larger than the coverage error of the Hispanic population. Furthermore, a number of studies show a substantial amount of variability in individual responses over time. The implications of these definitional problems for the estimation of coverage of the Hispanic population in 1970 are explored in this report.

The evaluation of census data by demographic techniques requires data from sources other than the census. The usual non-census sources—vital registration, immigration records, and administrative records—provide only limited data on the Hispanic population. The data that are available are either incomplete or are of unknown completeness in terms of either population coverage or geographic coverage or do not adequately identify the Hispanic population. As a result, they may not be compatible with any identifier from the census or may require major supplementation (as, for example, for illegal immigration or understatement of emigration). The lack of satisfactory national data on the Hispanic population from independent sources means that the analyses to the coverage of census data which can be made by conventional demographic techniques are mainly checks on the internal consistency of the census data and provide only rough general indications of errors rather than specific estimates of coverage.

Among the techniques providing general indications of error which have been applied to the census data on the Hispanic population for 1970 are the measurement of age heaping, use of indexes of age-sex composition, and the analysis of census survival ratios, death rates, and sex ratios. As a result of applying these techniques no gross errors were found in the data.

Some of the standard demographic techniques for measuring coverage, such as the use of survivors of births as the expected population for a substantial part of the age distribution, were not applicable to the Hispanic population. Applying these techniques would have required making unsupportable assumptions of such broad scope that the resulting estimates of coverage would be conjectural at best. One approach, intercensal cohort analysis, did yield rough estimates of the change in coverage of three selected Hispanic subgroups between the 1960 and 1970 censuses, along with some illustrative estimates of net census error for 1970. Primarily on the basis of these calculations, some general observations relating to the coverage of the Hispanic population in 1970 can be made. The coverage of Hispanic males in 1970 was substantially worse than the coverage of Hispanic females and coverage of young adults was substantially worse than the coverage of other age groups. The population of Cuban birth showed an overall undercoverage of about 3 to 4 percent in 1970. Unlike the White and Black populations, coverage of the Puerto Rican population and the second-generation Mexican-American population appears to have improved substantially between the 1960 and 1970 censuses. The estimates suggest roughly a 5-percent improvement for the population of Puerto Rican birth or parentage and a 6-percent improvement for the native population of Mexican parentage (excluding age cohorts born during the decade, i.e., under 10 years of age in 1970). Coverage of these three subgroups of the Hispanic population, taken as a group, appears to have improved by about 5 percent between 1960 and 1970. However, the three groups, constitute less than two-fifths of the reported population of Spanish origin in 1970.

Although intercensal cohort analysis provided indications of the 1960-70 changes in coverage, the lack of coverage estimates for the 1960 census and of comprehensive vital statistics and immigration data for the Hispanic population for the 1960-70 period precluded the calculation of definitive estimates of the absolute level of coverage of the Hispanic population in the 1970 census. These difficulties limited the development of coverage estimates in 1970 to ones which could be designated as illustrative at best.

The results of demographic analysis suggest a tentative hypothesis regarding the relative coverage levels of the Hispanic, White, and Black populations, that is, that the coverage of the Hispanic population in the 1970 census was intermediate between the coverage of Whites and the coverage of Blacks. The general indications of errors, such as those provided by indexes of age heaping, age ratios, and sex ratios, are consistent with this hypothesis. It is further supported by intercensal cohort analyses which yielded intermediate coverage estimates for three selected subgroups of the Hispanic population (foreign-born Cubans, Puerto Ricans, natives of Mexican parentage) in 1970 for a wide range of assumptions as to the coverage rates for these subgroups in the 1960 census. This type of analysis could not be carried out for the foreign-born population of Mexican

origin and, hence, any "finding" regarding the coverage of the Hispanic population based on calculations for the three subgroups fails to incorporate the effect of the possibly differential coverage of several numerous foreign-born subgroups, which may have included a substantial number of persons illegally resident in the United States.

The possibilities and prospects for estimating the coverage of the Hispanic population in 1980 are also considered. Successful application of demographic techniques to this problem will mainly require the development of sources of data on the Hispanic population other than the census. Steps are being taken to expand the range of Hispanic data, e.g., vital statistics, but these will be of little utility for 1980. Resolution of the problem of the subjectivity of the identifier and the inconsistency in the identification of Hispanic persons would also aid greatly in developing adequate coverage estimates, but the prospects here are for only limited improvement. Case-by-case match studies, such as a Census/Post-Enumeration Survey/Social Security Match Study, are being planned for 1980 by the Bureau of the Census. If such studies are successfully carried out, then the prospects for estimating the coverage of the Hispanic population in the 1980 census should be considerably better than they were for the 1970 census.

Methods of Coverage Evaluation

A variety of methods have been devised to evaluate census data. The Census Bureau has used many of these methods to measure the coverage of the population in recent censuses. These methods are enumerated and briefly described here, with some indication of the issues and problems in applying them to the evaluation of the coverage of the Hispanic population in the 1970 census. These methods may be classified as (1) case-by-case matching, employing data from either (a) a reinterview survey or (b) records; (2) demographic methods, employing either (a) demographic analysis or (b) comparison with aggregated data from administrative records; or (3) "statistical" methods, involving either (a) synthetic methods or (b) correlation estimation methods.³

CASE-BY-CASE MATCHING

Reinterview Survey

A reinterview survey consists of reenumerating a probability sample of households and matching the individuals in them on a case-by-case basis with the census, for the purpose of checking the coverage of the population represented by the households in the census (or the accuracy of the reporting of the characteristics of the matched persons). Two major limitations of the reinterview method are its requirement of perfect or nearly perfect matching and the tendency for coverage errors in the reinterview to be correlated with coverage errors in the census (i.e., the chance of being excluded from the census is associated with the chance of being excluded from the reinterview). The first limitation tends to result in an overstatement of the omission rate, the second in an understatement. These limitations affect the use of this method for evaluation of the coverage of the Hispanic population as well as the total population. The tendency of reinterview studies to suffer from correlation bias, in particular, sharply limits their utility for the direct estimation of the coverage of the Hispanic population.

A principal advantage of the reinterview procedure is that the coverage of the reinterview survey does not have to be complete to establish the true level of undercoverage in the

census.⁴ Another advantage is its ability to measure the components of net census error (that is, to distinguish coverage error from reporting or classification error) if the appropriate match studies are carried out. Because of the different concepts employed in the census to count the Hispanic population, the capability of the reinterview procedure to measure the principal components of error is especially useful. The in-depth probes generally included in the reinterview, such as alternative and detailed forms for questions, provide valuable information relating to group definition.

Shifts in identification of individuals as Hispanic over time with the same identifier, differences in identification of individuals as Hispanic with different identifiers for the same date, and differences in the identification of individuals as Hispanic in synchronous surveys, such as a census and a reinterview sample survey, with the same identifier can be measured and analyzed by use of a sample reinterview survey. The Census Bureau has conducted a number of studies using techniques similar to the reinterview method that were designed to measure such shifts and differences. The specific studies are discussed in later sections of this report.

Record Checks

A record check consists of matching a list of names, either a sample drawn from a set of records or the complete set, against the census being evaluated. The principal advantage of the record-check method over the reinterview method is that omissions from the record file are less likely to be correlated with omissions from the census. As with the reinterview method, completeness of the list is not a necessary condition for its use in evaluating coverage in the census; the two collection systems need only be independent, that is, the chance of inclusion in each of the two systems should not be correlated. Moreover, these methods do not require use of other external data such as migration data and, hence, they can be employed effectively to measure coverage for geographic areas within the United States.

In practice the limitations of the record-check method are the same as for the reinterview method. The matching problem remains and, in spite of the greater likelihood of

³ For a fuller explanation, with illustrative applications, see U.S. Bureau of the Census, *Current Population Reports*, Series P-23, No. 56, "Coverage of Population in the 1970 Census and Some Implications for Public Programs," August 1975, especially pp. 1-13; and Series P-23, No. 65, "Developmental Estimates of the Coverage of the Population of States in the 1970 Census: Demographic Analysis," December 1977, especially pp. 1-9.

⁴ See Eli S. Marks, William Seltzer, and Karol J. Krotki, *Population Growth Estimation*, The Population Council, New York, 1974, esp. Chapter 2.

independence between the census and the record file, the two sets of records will not be completely independent. While the record is accessible at any time for matching of individuals, the form and content of the record file must be accepted as given; as a result the matching procedure is rendered more difficult. Furthermore, because the analysis depends on the content of the record files, the record-check method tends to provide less information on the components of net census error.

The most serious problem in the application of the record-check method for evaluating the national or regional coverage of the Hispanic population in the 1970 census is the lack of an adequate set of records, other than the census, which is national or regional in scope and in which the Hispanic population is identified. This situation precludes the direct application of the record-check technique to the measurement of the coverage of the Hispanic population for 1970.

DEMOGRAPHIC METHODS

Aggregated Data From Administrative Records

Estimates of net census errors can sometimes be obtained by comparing census data with aggregated data from administrative records such as Social Security records of covered workers, Medicare records, or school enrollment records. The administrative record file must be complete or must be adjusted for incompleteness, and further adjusted for differences in scope and definition from the census. This method can provide estimates only for particular age-sex segments of the population and for the net census error, not the (coverage and classification) components of error. The major shortcoming of this method for the estimation of the coverage of the Hispanic population is, again, the lack of a set of administrative records identifying the Hispanic population with which the census can be compared.

Demographic Analysis

The method of demographic analysis consists essentially of the development, by various demographic techniques, of expected values for the population in the census categories to be evaluated and the comparison of these expected values with the actual census counts. The expected values are derived by combining data essentially independent of the census being evaluated, such as birth, death, and immigration statistics and data from other censuses, and employing such techniques or devices as life tables, intercensal cohort analysis, expected sex ratios, and population models.

Demographic analysis can provide an estimate of net coverage error for the entire population (for which there is no classification error) and estimates of net census error, which combine both coverage and reporting error, for specific groups in the population, such as age, sex, and race groups. The principal limitation of demographic analysis for estimating census coverage is that the expected population developed by this method is directly affected by errors in the basic demographic data and the methodological assumptions employed.

Because of the lack of data on the Hispanic population from independent sources for the entire country or for a particular region or regions, the possible application of demographic analysis to the estimation of the coverage of the Hispanic population in the 1970 census is severely limited. Rough indications of the overall quality of the data for the Hispanic population can be secured, however. The demographic techniques employed do not provide actual estimates of coverage error; rather, they give indications of internal inconsistencies in the census data that can be used to suggest the occurrence of coverage and reporting problems, particularly in certain age-sex groups. One technique, intercensal cohort analysis, is also used to derive some rough estimates of bicensal relative coverage error in the 1970 and 1960 censuses for several subgroups of the Hispanic population.

STATISTICAL METHODS

Another possible approach to the estimation of the coverage of the Hispanic population for subnational areas in the 1970 census involves the application of "statistical" methods. There are many variations of these methods but the primary variations are the synthetic and correlation-estimation methods. The standard version of the synthetic method involves the application of rates or proportions, for specific segments of the population (e.g., socioeconomic or residence categories), relating to some characteristic of the population (e.g., coverage) at a given geographic level (e.g., the United States), to the population at some subordinate level (e.g., States). For example, synthetic coverage estimates for States could be derived by applying national coverage rates for income classes to State populations disaggregated by income. Synthetic estimation could be applied to the Hispanic population if detailed coverage estimates for demographic and socioeconomic segments of the national Hispanic population, or even of the national total population, were available. This requirement cannot be met for 1970. The correlation-estimation method requires detailed estimates of coverage for at least a sample of geographic subdivisions of the United States and hence cannot be applied in 1970.

Alternative Definitions of the Hispanic Population and Implications for Coverage Evaluation

ALTERNATIVE DEFINITIONS IN CENSUS DATA

Recent censuses have provided some data on the Hispanic population. The Bureau of the Census has used a number of different bases to identify the Hispanic population or some of its subgroups in decennial censuses. The various identifiers include:

- a. Country of birth and country of birth of parents (1880 to 1970)
 1. Mexico, Cuba, Central or South America, other (1880 to 1970)
 2. Puerto Rico (1950, 1960, 1970)
- b. Mexican "race" (1930 only)
- c. Spanish surname in five Southwestern States (1950, 1960, 1970)
- d. Spanish mother tongue (1940 and 1970)
- e. Spanish origin, by type: Mexican, Puerto Rican, Cuban, Central or South American, other (1970)

By combining the four identifiers employed in 1970, the Bureau of the Census defined six different Hispanic populations either regionally or nationally: Spanish origin or descent, Spanish surname (five States only), Spanish language, Spanish heritage, Spanish surname (five States only) or language, and Spanish birth or parentage.

Problems of comparability, coverage, and insufficient scope limit the utility of these data in evaluating the 1970 census.⁵ Each of these identifiers presents special problems in the precision with which the Hispanic group is defined, the degree of applicability of the identifier to the Hispanic population, the difficulty of constructing an expected population, and the utility of the identifier for estimating coverage.⁶

⁵ U.S. Bureau of the Census, "Data on the Spanish Ancestry Population Available from the 1970 Census of Population and Housing," Data Access Descriptions, DAD No. 41, May 1975, and Persons of Spanish Ancestry, Supplementary Report PC(S1)-30, 1970 Census of Population, February 1973.

⁶ José Hernández, Leo Estrada, and David Alviré, "Census Data and the Problem of Conceptually Defining the Mexican-American Population," *Social Science Quarterly*, Vol. 53(4), March 1973, pp. 671-687.

Country of Birth or Parentage

The questions on place of birth of each individual and country of birth of parents have provided the only consistent method of identifying foreign stock from Spanish-speaking countries in successive censuses. These questions are currently of limited utility in identifying members of the Hispanic population, however, because there are large numbers of people of Spanish (particularly Mexican) origin who are third-or-higher-generation residents of the United States. In some areas of the Southwest, particularly New Mexico, this problem is especially acute because there are many people of Spanish origin with a distinctive Mexican culture whose ancestors have lived in the same area for centuries.

For some of the other Spanish-origin subpopulations, in particular the Cuban and Puerto Rican populations, most individuals are first-or-second-generation residents, so that data on country of birth and country of birth of parents should cover almost all persons of this background. For these groups very rough coverage estimates might be obtained by demographic analysis using immigration statistics classified by country of origin for the last few decades from the Immigration and Naturalization Service (INS) and estimates of births and deaths to this group for this period. (See the subsequent section, "Intercensal Cohort Analysis.") The reliability of these coverage estimates would still be in question, however, because vital statistics are not available according to country of birth or country of birth of parents. Place of birth of parents is recorded on the birth certificate, and place of birth is recorded on the death certificate, but this information is not tabulated by the National Center for Health Statistics.

The population of Puerto Rican birth or parentage in 1970 as well as in 1960 and 1950 may be identified by the questions on place of birth and place of birth of parents. In these censuses, these classifiers identified practically all of the population of Puerto Rican origin because even in 1970 this population still consisted mainly of first or second generation residents in the United States. (Less than 10 percent of the second generation of Puerto Ricans in the United States was over 30 years of age in 1970.)

Mexican "Race"

The Bureau of the Census tried to identify all persons of Mexican origin, regardless of generation, in the 1930 census by including a category "Mexican" in the question on race. The classification of Mexican as a race was markedly unpopular, particularly with the Mexican Government, and was not attempted again.

Spanish Surname

In 1950, 1960, and 1970, the Census Bureau attempted to identify Mexican-Americans in five Southwestern States (i.e., Arizona, California, Colorado, New Mexico, and Texas) through the use of a list of Spanish surnames. The list used in 1970 was developed by the Bureau of the Census after periodic revisions of a list originally compiled in the 1930's by the Immigration and Naturalization Service. The identification of Mexican-Americans through surnames makes possible the inclusion of persons beyond the first two generations in any tabulation of the group.

This identification technique, as it has been applied, has major shortcomings. Many of the "Spanish" surnames on the list are apparently common among persons of Italian, Portuguese, or similar origins. For this reason, the Census Bureau confined the tabulations based on the list to the five Southwestern States where most of the Mexican-American population lives and where there are few other persons of Latin, non-Hispanic origins (unlike the situation in other parts of the country). Even in this area the correspondence between the population with Spanish surnames and the population of Mexican ethnicity is not always very close. In the five Southwestern States, only about 74 percent of the Spanish-origin population is of Mexican origin and 81 percent of the Spanish-surname population is of Spanish origin.⁷ In many parts of these States, however, the problem is less pronounced. In research encoding the city directory of Waco, Texas, according to the Bureau's list of surnames, only 4 percent of the Spanish-surname population could not trace their ancestry to Mexico.⁸ On the other hand, as migration into the Southwest by persons from Spanish-speaking countries other than Mexico increases, the likelihood that Spanish surnames will identify Mexican-Americans only will decrease.

A further difficulty with the Spanish-surname classification is that women who marry men with non-Spanish surnames are lost to the Hispanic population, as are their children. About 15 percent of Mexican-American women marry non-Mexican-American men so that the potential loss to the Spanish surname population is substantial. At least part, if not all, of this loss is offset by marriages of Anglo women to Mexican-American men, however.

The geographic restriction to the Southwest places severe limitations on the use of the concept of a Spanish-surname population for estimating coverage in the Southwest by the usual demographic methods. The population is not closed (i.e., is subject to migration) and there is no reliable way of measuring the migration of this population to and from the area. Migrants from the five Southwestern States to the rest of the United States and to foreign countries are lost to the Spanish surname population in later censuses and estimates of the number of such migrants are likely to be very rough at best.

Spanish Language

Spanish mother tongue was used as the principal basis for measuring the Spanish-language population in 1970 but the Spanish-language population included many persons in addition to those of Spanish mother tongue. The Spanish-language population was comprised of persons of Spanish mother tongue and all other persons in families in which the head or wife reported Spanish as his or her mother tongue. The 1970 census question on mother tongue was asked of all persons in the 15-percent sample; mother tongue refers to the language spoken in the person's home when he or she was a child.

Problems of consistency in definition and scope of the identifier complicate the evaluation of the coverage of the Hispanic population based on the Spanish-language identifier. The Spanish-language population is not a closed population and it is not clearly equivalent to the population which considers itself, or is considered by the general population, to be the Hispanic population. Persons may gain Spanish-language affiliation by marriage and lose it by separation or divorce. The children of persons of Spanish mother tongue do not necessarily fall into the Spanish-language population when they became adults. The phenomenon of shifting identification may have been increasing over time as more of the Spanish-language population has assimilated culturally.

It would appear that the Hispanic population cannot be adequately defined by a single characteristic such as language. For example, it is possible that many persons who consider themselves Hispanic may not have spoken the Spanish language at home as a child. As a greater percentage of the Spanish-origin population has become third or higher generation residents and as more and more Hispanic families have moved out of ethnic enclaves, more Hispanic children may have been reared speaking English. As a result, the Spanish-language identifier becomes less successful in identifying the Hispanic population. One final difficulty with this identifier is that it does not differentiate among the various Hispanic subpopulations.

Reliable estimation of the Spanish-language population by demographic analysis is not now possible. In addition to the problem of measuring change due to shifts in identification, there is the problem of measuring the births, deaths, and immigration for this group.

⁷ U.S. Bureau of the Census, Technical Paper No. 38, *Comparison of Persons of Spanish Surname and Persons of Spanish Origin in the United States*, 1975.

⁸ Raymond H. C. Teske, Jr. and Bardin H. Nelson, "Fertility and Related Demographic Variables among Middle-Class Mexican-Americans: A Descriptive Analysis," unpublished paper presented at the 1975 meeting of the Southwestern Social Science Association, San Antonio, Texas, March 1975.

Spanish Heritage

The Spanish-heritage population, defined only for the 1970 census, is an unduplicated combination of populations identified by three of the criteria discussed above, primarily Spanish language. Specifically, it consists of the population identified by:

1. Spanish surname or Spanish language in the five Southwestern States (Arizona, California, Colorado, New Mexico, Texas);
2. Puerto Rican birth or parentage in the Middle Atlantic States (New Jersey, New York, Pennsylvania); and
3. Spanish language in the remaining 42 States and the District of Columbia.

These data have the advantage of being national in scope. However, except for the Puerto Rican population in the Middle Atlantic States, the various Hispanic subpopulations are not distinguished in the figures.

Attempting to evaluate the Spanish-heritage figures by developing an independent estimate of the expected population of Spanish heritage would be an almost impossible task. The population is a loosely concocted mixture rather than a compound of even consistency. Children of members of the Spanish-heritage population may not be members of this population group. Furthermore, individuals may move in and out of the population as they change their residences within the United States. For example, persons of Puerto Rican parentage with a Spanish surname but not of Spanish mother tongue would leave the Spanish-heritage population if they moved from New York to Kansas but would reenter it if they then moved to California. Their children would not be counted as part of the Spanish-heritage population (through Spanish surname) until the families arrived in California. Given problems such as these and the others noted, it would be futile to attempt an evaluation of the 1970 census count of the Spanish-heritage population by demographic methods in spite of the relatively objective nature of the definition.

Spanish Origin

The limitations in the use of Spanish surnames in the Southwest, Spanish country of birth and Spanish country of birth of parents, Spanish language, and Spanish heritage to identify the Hispanic population led the Census Bureau to try another method of identifying this group in the 1970 census, namely, use of a specific question on Spanish origin or descent. In November 1969, a supplement was appended to the Current Population Survey (CPS), which asked for a person's origin or descent (by self-identification) as Hispanic (several categories) or non-Hispanic. Specifically, respondents were asked if they were of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish origin or descent.

This practice has been continued, although the various sets of data are not strictly comparable because the form of

the question, the classificatory system and practices, and the sample design have varied. The same question was asked in the 1970 census on the 5-percent sample questionnaire. For the March 1971 and March 1972 Current Population Surveys, the question on origin or descent was expanded to include ethnic groups other than Spanish, and the category "Mexican (Mexicano)." These changes in nomenclature probably had only small effects on the figures for the Mexican-American population as identified. More importantly, the method of assigning children under 14 to the Spanish-origin category was changed in 1973 so that children in households where the wife (but not the head) was of Spanish origin were classified as Spanish. This change added about 300,000 children to the Spanish-origin category between 1972 and 1973.

Two major advantages of the question on Spanish origin as an identifier of the Hispanic population are its ability to identify various subpopulations and its ability to cover third and higher generation residents of Spanish descent. The primary limitation of the Spanish-origin question, particularly for coverage evaluation, stems from the self-designation feature of the question. An individual's conception of himself or herself as of Spanish origin or non-Spanish origin may vary over time.⁹ Because of this variability of self-identification, the definition of exactly who is a member of the Spanish-origin population is unclear and often ambiguous. This fuzziness of group boundaries would make the calculation of an independent estimate of an expected population difficult under the best circumstances but the problem is complicated by the lack of adequate data corresponding to this identifier. These issues are particularly relevant for 1980 and later years since a question on Spanish origin or descent is to be included on the 100-percent questionnaire for the 1980 census and self-designated Spanish origin or descent will be the primary means for identifying members of the Hispanic population.

IMPLICATIONS OF ALTERNATIVE DEFINITIONS FOR COVERAGE EVALUATION

Differences in Census Counts

The figures for the Hispanic population of the United States in 1970 vary considerably for the four identifiers (or classifiers) applicable at the national level, from a low of 9,073,000 for the population of Spanish origin or descent to 10,115,000 for the Spanish-language and/or surname population. The second figure exceeds the first by 11.5 percent (table 1). For the five Southwestern States, the area with the greatest concentration of Hispanic population, the relative excess of the highest figure over the lowest figure based on the various identifiers is even greater, about 30 percent. The figures range from 4,668,000 for the Spanish-

⁹ Several studies conducted by the Bureau of the Census bear on this point. They are discussed in more detail in the next section of this report.

A similar phenomenon has been found among American Indians; see Jeffrey S. Passel, "Provisional Evaluation of the 1970 Census Count of American Indians," *Demography* 13 (1), August 1976, pp. 397-409.

Table 1. Hispanic Population According to Various Identifiers, for the United States and Selected Areas Within the United States: April 1, 1970

Identifier	United States	Southwestern States ¹	Remainder of United States	Middle Atlantic States ²	Florida
NUMBER					
Spanish origin ³	9,072,602	5,008,556	4,064,046	1,749,363	405,036
Spanish surname ⁴	(X)	4,667,975	(X)	(X)	(X)
Spanish language ⁵	9,589,216	5,662,700	3,926,516	1,873,051	451,382
Spanish heritage ⁶	9,294,509	6,188,362	3,106,147	1,052,682	451,382
Spanish language or surname ⁷ ...	10,114,878	6,188,362	3,926,516	1,873,051	451,382
Spanish birth or parentage ⁸	5,241,892	2,321,642	2,920,250	1,738,802	336,961
PERCENT OF SPANISH ORIGIN ⁹					
Spanish origin.....	100.0	100.0	100.0	100.0	100.0
Spanish surname.....	(X)	93.2	(X)	(X)	(X)
Spanish language ⁵	105.7	113.1	96.6	107.1	111.4
Spanish heritage ⁶	102.4	123.6	76.4	60.2	111.4
Spanish language or surname....	111.5	123.6	96.6	107.1	111.4
Spanish birth or parentage.....	57.8	46.4	71.9	99.4	83.2

X Not applicable.

¹Arizona, California, Colorado, New Mexico, and Texas.

²New York, New Jersey, and Pennsylvania.

³U.S. Bureau of the Census, Census of Population: 1970, Subject Reports, PC(2)-1C, Persons of Spanish Origin, 1973, table 1.

⁴U.S. Bureau of the Census, Census of Population: 1970, Subject Reports, PC(2)-1D, Persons of Spanish Surname, 1973, table 1.

⁵This group consists of all persons of Spanish mother tongue and all other persons in families in which the head or wife reported Spanish as his or her mother tongue. U.S. Bureau of the Census, Census of Population: 1970, Supplementary Report, PC(S1)-30, Persons of Spanish Ancestry, 1973, table 3.

⁶This group consists of persons of Spanish language or surname in the 5 Southwestern States, persons of Puerto Rican birth or parentage in the 3 Middle Atlantic States, and persons of Spanish language in the remaining 42 States and the District of Columbia. U.S. Bureau of the Census, Census of Population: 1970, General Social and Economic Characteristics, PC(1)-C, 1972, table 85 (United States) and table 49 (States).

⁷Ibid., table 86 (United States) and table 49 (States).

⁸Op.cit., PC(S1)-30, table 5.

⁹Figures represent ratio of specified population to Spanish-origin population (per 100).

surname population to 6,188,000 for the Spanish-heritage population. This difference cannot be attributed to sampling variability since it is considerably greater than its 95-percent confidence interval; it represents, therefore, a real variation in the size of the Hispanic population according to various identifiers.

The large differences between the counts of the Hispanic population according to different identifiers have serious implications for estimating the coverage of the Hispanic population in the 1970 census. If the undercoverage rate of the Hispanic population in 1970 was similar to that of Whites or Blacks, it would fall in the range of 2 to 10 percent. The differences among the various counts of the Hispanic population are generally of this magnitude or larger. Thus, in attempting to measure the undercoverage of the Hispanic population in the 1970 census, we are trying to estimate quantities which are smaller than the differences which can be attributed to definitional variation and, as will be seen next, to response variability for a particular definition.

Consistency of Response

Some evidence is available suggesting that individuals' responses as Hispanic or non-Hispanic vary considerably from time to time. Five studies provide evidence on the reliability and consistency of answers to the Spanish-origin question: (1) 1970 Content Reinterview Survey;¹⁰ (2) CPS match studies for March 1971, 1972, and 1973;¹¹ (3) special census of Gallup, New Mexico, November 1974;¹² (4) Spanish origin-Spanish surname cross-classifications from the March 1971 CPS;¹³ and (5) the National Content Test of 1976.¹⁴

¹⁰U.S. Bureau of the Census, 1970 Census of Population and Housing: Evaluation and Research Program PHC(E)-9, Accuracy of Data for Selected Population Characteristics as Measured by Reinterviews, 1974.

¹¹U.S. Bureau of the Census, Technical Paper No. 31, Consistency of Reporting of Ethnic Origin in the Current Population Survey, 1974.

¹²Unpublished tabulations and records.

¹³U.S. Bureau of the Census, Technical Paper No. 38, op. cit.

¹⁴Unpublished tabulations and records.

Table 2. Consistency of Responses to the Spanish-Origin Question as Measured by Reinterview Studies and the Current Population Survey, by Type of Spanish Origin: 1970 to 1976

(Base of percent is the population in the reinterview or in the second-named survey. Nonresponses and responses of "don't know" have been eliminated from the calculations)

Study and measure	All Spanish origins	Mexican origin	Puerto Rican origin	Cuban origin	Central or South American origin	Other Spanish origin	White	Black	American Indian
PERCENT SAME CATEGORY									
1970 Content Reinterview Study ¹	75.9	(NA)	(NA)	(NA)	(NA)	(NA)	³ 99.5	³ 99.1	(NA)
1971-1972 March CPS Match.....	94.6	91.3	95.0	94.6	71.3	40.9	(NA)	96.2	(NA)
1972-1973 March CPS Match.....	90.9	86.1	92.1	83.3	73.0	46.6	(NA)	96.9	(NA)
1974 Gallup, N.M. Reinterview.....	89.2	74.1	(B)	(B)	(B)	45.9	(NA)	97.9	91.7
1976 NCT Reinterview.....	93.9	96.1	93.9	(B)	(B)	4.6	(NA)	(NA)	(NA)
PERCENT NET DIFFERENCE ²									
1970 Content Reinterview Study ¹	+7.9	(NA)	(NA)	(NA)	(NA)	(NA)	³ +0.3	³ -0.7	(NA)
1971-72 March CPS Match.....	-3.4	+0.6	+2.9	-10.1	-48.3	-16.7	(NA)	+2.1	(NA)
1972-73 March CPS Match.....	+3.3	+5.7	-2.2	+2.0	-2.5	+5.9	(NA)	+0.2	(NA)
1974 Gallup, N.M. Reinterview.....	+6.0	+15.0	(B)	(B)	(B)	-50.9	(NA)	-2.1	-3.0
1976 NCT Reinterview.....	-4.6	-48.8	-23.5	(B)	(B)	+83.4	(NA)	(NA)	(NA)
PERCENT NON-SPANISH ORIGIN ⁴									
1970 Content Reinterview Study ¹	24.1	(NA)	(NA)	(NA)	(NA)	(NA)	(X)	(X)	(X)
1971-72 March CPS Match.....	5.4	2.7	1.3	2.0	9.2	24.2	(X)	(X)	(X)
1972-73 March CPS Match.....	9.1	4.4	4.4	2.5	18.0	30.3	(X)	(X)	(X)
1974 Gallup, N.M. Reinterview.....	10.8	11.0	(B)	(B)	(B)	9.3	(X)	(X)	(X)
1976 NCT Reinterview.....	6.1	3.6	4.1	(B)	(B)	8.6	(X)	(X)	(X)

B Base of percent less than 40 persons. NA Not available. X Not applicable.

¹The question in the reinterview differed considerably from the census question. Results may not be comparable with others shown.

²A plus sign (+) indicates a net shift into the category in the reinterview phase; a minus sign (-) indicates a net shift out of the category.

³From 1970 CPS-Census Match Study.

⁴These figures represent the proportion of a Hispanic subgroup, as identified in the second survey or interview, that was identified as non-Hispanic in the first survey or interview. Most persons reporting different origins in the two interviews reported a Hispanic origin in both interviews.

Sources: Content Reinterview Study--U.S. Bureau of the Census, Census of Population and Housing: 1970, Evaluation and Research Program PHC(E)-10, Accuracy of Data for Selected Population Characteristics as Measured by Reinterviews, 1974, tables A, D, and I.

CPS Longitudinal Match Studies--U.S. Bureau of the Census, Technical Paper No. 31, Reporting of Ethnic Origin in the Current Population Survey, 1974, tables D and K.

Gallup and NCT Reinterviews--Unpublished tabulations.

Consistency of Response: 1970 Content Reinterview Survey

The Content Reinterview Survey taken following the 1970 census included the question, "Where did your father's (or mother's) ancestors come from?" An individual was then classified as being of Spanish origin or descent if any of his or her ancestors came from a Spanish-speaking country. This classification differs somewhat from the 1970 census classification because it includes as Spanish some people who may think of themselves as primarily of some origin or descent other than Spanish.

The likelihood of reporting Spanish origin in the census declined with the distance of the relationship between the respondents and their immigrant forebears. Of the popula-

tion born in "Hispanic" countries (according to the reinterview), 99 percent reported being of Spanish origin in the census. For the second generation (at least one parent from a Hispanic country), about 83 percent reported being of Spanish origin in the census; for the third generation, 73 percent; for fourth generation, 44 percent; and for those whose Spanish ancestry is further removed than great-grandparents, only 6 percent reported being of Spanish origin in the census. For persons reporting Spanish origin on both sides of the family in the reinterview, 97 percent reported Spanish origin in the census, whereas only 21 percent with Spanish origin on one side reported themselves to be of Spanish origin in the census.¹⁵

¹⁵U.S. Bureau of the Census, Evaluation and Research Program PHC(E)-9, op. cit., pp. 5-8 and table 1.

These data clearly indicate that the relatively objective criterion of having an ancestor, albeit distant, from a Hispanic country does not correspond to the psychosocial criteria applied by respondents to determine their own origin or descent.

Overall, only 76 percent of the persons reporting ancestors from Hispanic countries in the Content Reinterview Survey reported any type of Spanish origin in the census. The consistency of reporting varied considerably according to the characteristics of the respondent. Those with Spanish surnames reported Spanish origin more consistently than those without Spanish surnames. Respondents who were foreign-born reported Spanish origin more consistently than those who were native. Persons living in the Southwest reported Spanish origin more consistently than those in other areas.

Consistency of Response: CPS Longitudinal Match Studies

Because of the design of the Current Population Survey, it is possible to match approximately half of the sample on a case-by-case basis from one year to the next. Such longitudinal match studies were carried out between the March 1971, 1972, and 1973 CPS samples. The consistency of reporting Spanish origin in the March 1971–March 1972 and in the March 1972–March 1973 match studies is summarized in table 2.¹⁶

These studies indicate that persons of Mexican, Puerto Rican, and Cuban origins report their origin more consistently than persons of Central or South American and Other Spanish origins.¹⁷ Although the populations of Mexican, Puerto Rican, and Cuban origin fall in the range called highly consistent in the report (80 to 95 percent reporting the same category in both years), from the point of view of measuring the coverage of a group even a 5-percent inconsistency is disturbingly and intolerably large. In fact, the 95.0-percent consistency reported for the Puerto Rican origin group in the March 1971–March 1972 match study could be substantially larger or smaller because the 95-percent confidence interval is 90.4 percent to 99.6 percent. The high consistency in reporting of Puerto Rican and Cuban origins is related to the recency of immigration; the vast majority of these persons are first- or second-generation Americans.

For each of the various Spanish-origin populations, a large percentage of those who reported a different origin on the second interview remained within the Spanish-origin population. Many of these individuals chose the "Other Spanish" category on one occasion (giving a local or nationalistic designation such as *Hispano* or *Borinqueño*) and a specific origin group on the other. Of those who incorrectly

reported the Spanish-origin group, many non-Hispanic persons had misinterpreted the phrase "Central or South American origin" to mean central or southern United States. This problem also affected the 1970 census reports and in addition to distorting the data on Central or South American origin, renders the data for all Hispanic origins combined less satisfactory for estimating the coverage of the group.¹⁸

For the Nation as a whole, it appears that, from the point of view of estimating the *total size* of the Spanish-origin population, reporting of origin is relatively consistent over time, as is reporting of the major subgroups, Mexican, Puerto Rican, and Cuban. However, from the point of view of measuring the *coverage* of these groups, the amount of inconsistency is excessive. Furthermore, self-identification of Spanish origin is not very consistent over time when specific geographic areas are considered.

Consistency of Response: Special Census of Gallup, New Mexico

In conjunction with the November 1974 special census of Gallup, New Mexico, the Census Bureau conducted an experiment to check the consistency of reporting of Spanish origin. The census questionnaire, which was mailed out, requested the respondent to indicate origin or descent. This mailing was followed up with an interview in which flashcards were used to solicit a reply to the question on origin or descent. The results comparing the reports on origin or descent are summarized in table 2.¹⁹

The level of overall consistency for Gallup is similar to the results of the other studies. About 80 percent of the persons calling themselves Spanish in the census did so again in the reinterview. However, the consistency of the Mexican-origin response was quite low—only 74 percent gave the same response. Most of the inconsistent responses involved changes from "Mexican" to "Other Spanish," or vice versa. These shifts illustrate some of the problems in attempting to identify a socially defined group in a self-enumeration census.

A large percentage of the members of the Spanish-origin population in New Mexico often refer to themselves as *Hispano* or *Spanish*, and not as *Mexican*, because they are descended from the original Spanish settlers of the area rather than from immigrants from Mexico. However, the culture of the New Mexican *Hispanos* is sufficiently similar to that of most Mexican-Americans that the two groups can be combined for most practical purposes.

The Census Bureau has used a number of alternative formats for the Spanish-origin question in order to identify the Hispanic population. Some of the formats included as response categories such terms as "Mexican-American," "Chicano," and "Hispano," either as separate categories or grouped with "Mexican" origin. Including various designations for the Mexican-origin population and tabulating them

¹⁶ Nonresponses and responses of "don't know" in either of the matched surveys have been eliminated from the calculations. Including such responses would, in general, reduce the percentage in the same category, increase the percent net difference, and increase the percent of non-Spanish origin.

¹⁷ Because of sampling variability, other differences between groups may not be significant, however.

¹⁸ The persistence of this problem in tests for the 1980 census has led to the elimination of the "Central or South American" category from the listed responses to the Spanish-origin question.

¹⁹ See footnote 16 regarding treatment of nonresponses.

together increases greatly the consistency of response for this population. Such categories might result in some slight confusion and in the erroneous inclusion of some persons of Portuguese or Brazilian origin as Spanish. However, the costs are likely to be small and are greatly outweighed by the benefits of a more consistently defined population.

The Gallup study highlights another facet of the problem of defining the population of Spanish origin or descent. In certain areas, the terms used by the respondents to define their own group membership differ from the more general terms used by the Census Bureau and other public agencies. This problem is especially prevalent in areas with large concentrations of Hispanic population, such as New Mexico, Texas, California, and New York. To the extent that the distinctive local terms are not recognized by the Census Bureau, the reliability of the data on the Spanish-origin population is lessened and the difficulty of defining a comparable expected population for coverage estimation is increased.

Consistency of Response: Spanish Origin-Spanish Surname Cross-tabulations

Cross-tabulations of the subjectively defined Spanish-origin population and the objectively defined Spanish-surname population provide valuable information on the reliability of both identifiers for delineating the Hispanic population of the United States. Such a study was carried out in connection with the March 1971 Current Population Survey.²⁰ The Spanish surnames were encoded with the list used for the 1970 census; Spanish origin or descent was tabulated

from responses to a question on origin or descent which contained 13 categories, 5 of which were Spanish.²¹

This report concludes that "identification by Spanish surname appears to provide a fair approximation of the Spanish-origin population in the five Southwestern States of the United States, but not in the States outside this area."²² This relationship can be seen in the data presented in tables 3 and 4. In the five Southwestern States, 81 percent of the population with Spanish surnames identified themselves as being of Spanish origin but, outside these States, only 46 percent did so. Likewise, of the population which identified itself as of Spanish origin, 74 percent had Spanish surnames in the five Southwestern States, but only about 61 percent did in the remainder of the United States. In general, the Spanish-surname and Spanish-origin identifiers correspond better for the Mexican-origin population than for any of the other Spanish subgroups. The same report also concludes that, in spite of the possible losses and gains for the Spanish-surname population through the marriage of women, there is no significant difference between the sexes in the percent with Spanish surnames who report Spanish origin or vice versa.

These findings have important implications for estimating the coverage of the Hispanic population in the 1970 census. Self-declared Spanish origin or descent is the best measure we now have for measuring the Hispanic population. However, nationally, the Spanish-surname population, as measured by the present list of Spanish surnames, does not approximate the Hispanic population as defined by Spanish origin or descent. In fact, about 11 percent of the "Spanish-

²⁰ U.S. Bureau of the Census, Technical Paper No. 38, *Comparison of Persons of Spanish Surname and Persons of Spanish Origin in the United States*, 1975.

²¹ "Mexicano, Chicano," "Puerto Rican," "Cuban," "Central or So. Amer.," and "Other Spanish."

²² U.S. Bureau of the Census, Technical Paper No. 38, *op. cit.*, p. 2.

Table 3. Proportion of Persons of Spanish Origin With Spanish Surnames, and Proportion of Persons With Spanish Surnames of Spanish Origin, for the United States and the Five Southwestern States: March 1971

(Numbers in thousands)

Origin and surname	United States	Five Southwestern States ¹	Remainder of United States
Persons of Spanish origin.....	8,957	5,345	3,612
Percent			
Of Spanish surname.....	68.3	73.6	60.5
Not of Spanish surname.....	31.7	26.4	39.5
Persons of Spanish surname.....	9,575	4,850	4,725
Percent			
Of Spanish origin.....	63.9	81.1	46.2
Not of Spanish origin.....	36.1	18.9	53.8

¹ Arizona, California, Colorado, New Mexico, and Texas.

Source: U.S. Bureau of the Census, Technical Paper No. 38, *Comparison of Persons of Spanish Surname and Persons of Spanish Origin in the United States*, 1975, table A, p. 3.

surname" population outside of the five Southwestern States is actually of Italian origin.²³ Yet the only identifier for which it might be possible to get birth and death data for 1970 and earlier years is Spanish surname. Thus, there is a distinct lack of correspondence between the type of data that can be made available and the population for which coverage is to be measured.²⁴ Limiting coverage estimates to geographic areas for which Spanish-surname, the identifier available in the census and in non-census sources, corresponds more closely to the Hispanic population requires another type of data which is not available — information on migration within the United States of persons with Spanish surnames.

²³ Ibid., table 9.

²⁴ Current research at the Census Bureau suggests that it might be possible to develop a list of Spanish surnames which would provide better correspondence with the Spanish-origin identifier and which could be applied throughout the United States. See the section, "Plans for 1980" for further discussion.

Consistency of Response: National Content Test

The National Content Test (NCT) of July 1976 provided another observation on the consistency of reporting of Spanish origin. This survey covered two panels of retired CPS households (each of about 14,000 households). The question on Spanish origin listed seven categories of Spanish origin: "Mexican or Mexicano," "Mexican-American," "Chicano," "Puerto Rican," "Cuban," "Central or South American (Spanish)," "Other Spanish," or "No, none of these." In September 1976, detailed reinterviews were conducted with about 2,300 households from each sample. Respondents in the reinterview phase were asked a series of questions about the ethnicity of parents and ancestors and, finally, a question regarding ethnic self-perception.

The results of this reinterview study, shown in table 2, are generally consistent with the others previously discussed.²⁵ The reporting of all Spanish origins, Mexican

²⁵ See footnote 16 regarding treatment of nonresponses.

Table 4. Proportion of Persons of Spanish Origin With Spanish Surnames, by Type of Spanish Origin, for the United States and the Five Southwestern States: March 1971

(Numbers in thousands)

Area and type of Spanish origin	Total persons	Spanish surname	
		Number	Percent
UNITED STATES			
Total, Spanish origin.....	8,957	6,117	68.3
Mexican.....	5,023	3,793	75.5
Puerto Rican.....	1,450	913	63.0
Cuban.....	626	410	65.5
Central or South American.....	501	238	47.5
Other Spanish.....	1,356	764	56.3
FIVE SOUTHWESTERN STATES ¹			
Total, Spanish origin.....	5,345	3,933	73.6
Mexican.....	4,358	3,324	76.3
Other Spanish ²	987	609	61.7
REMAINDER OF UNITED STATES			
Total, Spanish origin.....	3,612	2,184	60.5
Mexican.....	665	469	70.5
Puerto Rican.....	1,407	898	63.8
Cuban.....	561	384	68.4
Central or South American.....	406	181	44.6
Other Spanish.....	573	252	44.0

¹ Arizona, California, Colorado, New Mexico, and Texas.

² Includes Puerto Rican, Cuban, Central or South American, and Other Spanish origin.

Source: U.S. Bureau of the Census, Technical Paper No. 38, Comparison of Persons of Spanish Surname and Persons of Spanish Origin in the United States, 1975, table 1, p. 13.

origin, and Puerto Rican origin was reasonably consistent. Over 90 percent of persons reporting one of these origins in the NCT reported the same category in the reinterview. For Mexican and Puerto Rican origins, the net shifts into these categories were extremely large (49 and 23 percent, respectively). Much of this change was the result of shifts of individuals who identified themselves as "Other Spanish" in the original interview into specific origin categories in the reinterview (net shift of 83 percent). The net shifts in the National Content Test appear to be much larger than for some of the other tests. These large shifts can probably be attributed not only to the previously discussed tendency to use local or nationalistic designations, but also to the probing nature of the NCT reinterview.

The National Content Test offers further evidence that self-designation as Spanish is subject to great response variability. The shift between specific categories for individuals designating themselves as Spanish illustrates further the difficulty of developing a set of categories for the Hispanic population which can provide unambiguous identification of individuals as members of specific Hispanic groups.

RELATION TO MEASUREMENT OF COVERAGE

Among other ways, the Census Bureau has been measuring ethnicity on the basis of self-identification of individuals with a group having a common heritage. In 1970, individuals were asked, "What is your origin or descent?" to determine Hispanic ethnicity and were classified as Hispanic if they reported themselves as belonging to a particular Hispanic subgroup. First or second generation residents of the United States can be considered to be of a particular origin or descent whether they designate themselves as such or not. However, individuals of perhaps the third or fourth generation should be counted as of a particular origin or descent only if they consider themselves to be of that origin or descent.

The Hispanic population of the United States, as defined collectively by its members through responses to questions on origin or descent, does not correspond to demographic notions of a population. The offspring of the Hispanic population may or may not be members of the Hispanic population depending on a number of factors, including external circumstances. Membership in the Hispanic population may change from time to time either as a result of change in self-identification or as a result of artificial factors (e.g., responses for other household members including children) which are not closely measurable.

The demographic methods used to estimate coverage are generally based on the assumptions that the offspring of members of a population will also be members of that population and that an individual enters a population by birth or immigration and leaves by death or emigration.²⁶ These as-

sumptions are obviously not valid for the population defined by the Spanish-origin question in the 1970 census. Thus, conventional demographic techniques are unlikely to give reliable coverage estimates for this population.

Estimation of the net census error of the Hispanic population as defined by origin or descent must take into account both omission of persons and errors in classification. When self-designation is the basis of defining membership in the Hispanic population, the notion of misclassification of adult respondents is, in a strict sense, not applicable since persons are of Spanish origin if they call themselves Spanish and, conversely, are not Spanish if they do not call themselves Spanish. Misclassification can perhaps be deemed to occur for those persons who would classify themselves differently if they responded personally to the question, the question was varied slightly, or the survey was repeated under similar conditions.²⁷ If sufficient data were available to develop estimates of net census error and its components for the Hispanic population, say from demographic analysis and a post-enumeration survey, it is probable, as suggested by the results of the match studies and consistency tests discussed, that a large part of the estimated net census error would consist of misclassifications of the types noted in addition to coverage error.

The overall impression given by the consistency tests is that the Hispanic population is a socially defined group of persons whose self-identification with the Hispanic population, and particularly with a given Hispanic subgroup, may vary over time and between different records, even without variation in the form of the question. Thus, even if birth and death data could be obtained for the Spanish-origin population, the possible inconsistency in self-designation as Spanish between vital statistics and census data could seriously prejudice the quality of any estimates of coverage error obtained by demographic analysis. The component of the difference between an expected figure and a census figure attributable to changing or inconsistent self-identification could be as large as the component attributable to coverage error. Changes or inconsistencies in self-identification, however, are not properly viewed as census-taking errors; rather such changes or differences reflect the changing views of individuals regarding their relation to other members of society as well as changing sociocultural conditions.

In sum, each of the various identifiers the Census Bureau has used to measure the size of the Hispanic population presents problems in evaluating census coverage for that group. In part, these problems are definitional in character. Lack of a precise definition of the Hispanic population is an evident obstacle to any attempt at deriving coverage estimates for the group by means of demographic analysis. The same problem applies to reinterview and record studies, but in much less degree.

²⁶The methods can also be applied to populations where *none* of the offspring are members and net immigration is inapplicable or nonexistent, or where the population is subject to change on the basis of measurable socioeconomic categories such as marriage or divorce.

²⁷Misclassification can, of course, also occur as a result of misinterpretation of the question on the part of respondents or enumerators, errors in recording responses, failure to follow the rules for assigning ethnicity to minors, and processing errors.

Applications of Coverage Evaluation Methods

Evaluation of the census count for the total population or an age-sex category by the method of demographic analysis requires an estimate of the true total population or the true population in the age-sex category. Such an estimate is ordinarily obtained by use of data independent of the census under study. In attempting to measure the coverage of the Hispanic population in the 1970 census, a number of demographic techniques were applied with varying degrees of success. The results of these efforts are described in detail following a review of the data useful in evaluating the coverage of the Hispanic population.

DATA ON THE HISPANIC POPULATION USEFUL IN COVERAGE EVALUATION

An adequate evaluation of the coverage of the Hispanic population in the United States in the 1970 census requires a set or sets of data essentially independent of the census itself, national in scope, nearly or wholly complete in coverage, and corresponding in concept to at least one of the identifiers of the Hispanic population used in the 1970 census.

Census Data

Data on the Hispanic population in the 1970 census can be obtained for any one of the six population groups previously enumerated: Spanish country of birth or parentage, Spanish surname, Spanish language, Spanish heritage, Spanish language or surname, and Spanish origin. For comparison with an independently developed estimate of the true population or for estimation of parameters or components used in deriving these estimates, the choice of census data is determined almost solely by the nature of the non-census data on which the estimate is based.

Non-Census Data

Data which can be considered for use in evaluating 1970 census data, particularly by demographic methods, can be obtained from vital records, immigration records, previous census records, Social Security records, and other administrative records.

Non-Census Data: Vital Statistics

Vital statistics tabulations for the Hispanic population are not now available on the basis of any Hispanic identifier

from the National Center for Health Statistics (NCHS), the Federal agency which compiles vital statistics. The standard birth and death certificates promulgated by the National Center, however, do contain information which could be used to identify a part of the Hispanic population according to two of the identifiers noted earlier. First, the names (including maiden name of mother on birth certificates) could be coded according to a list of Spanish surnames for the five Southwestern States. The development of vital statistics useful for measuring coverage of the Hispanic population would require coding surnames on birth and death certificates for a substantial period prior to 1970, perhaps 25 to 35 years.

Coding surnames on birth and death certificates for such a period, even if done on a sample basis, is an enormous undertaking and usable data might still not be obtained. Information regarding the completeness of registration of Spanish-surname births or births according to some other Hispanic identifier for the period is required for preparing component estimates (i.e., estimates employing birth, death, and migration data directly). Such information does not exist and cannot be accurately developed. Furthermore, vital statistics for the Spanish-surname population of only five States are of limited utility for demographic analysis in the absence of data on internal migration for the Hispanic population.

Another possibility for developing vital statistics for the Hispanic population, in this case national data, is to code the responses to the place-of-birth question on the death certificate and the place-of-birth-of-parents question on the birth certificate. Such a procedure could be used to identify deaths of first-generation residents and births of second-generation residents of Hispanic origin. Third-and-higher-generation births and second-and-higher-generation decedents could not be identified on this basis. Again, as with Spanish-surname data, these data would be needed for a substantial period of years prior to the 1970 census if they are to be useful for evaluating census coverage in 1970. Such tabulations are not currently available.

Some States and localities which have concentrations of Hispanic population provide vital statistics data for the Hispanic population according to surname, country of origin, or special ethnic identifiers. Three States, Arizona, California, and Texas, code births and deaths according to Spanish surname. Arizona has tabulated births and deaths for the Spanish-surname population since 1969 and Texas

has done so since 1970. California codes its vital records according to Spanish surname but does not tabulate the data. New Mexico has tabulated births and deaths according to ethnic group since 1960, using a classification system which distinguishes Anglo, Spanish, and Mexican. New York State tabulates births and deaths of Puerto Ricans, regardless of place of birth. Some cities and counties also provide tabulations of vital statistics for the Hispanic population: Dallas for Mexican-Americans (based on surnames), New York City for Puerto Ricans, Los Angeles county and San Antonio for the Spanish-surname population, etc. The data for the various States and cities are not all comparable, however. Coding practices and the lists of Spanish surnames employed vary considerably from place to place. The quality of the coding also varies and standards are often lower than acceptable for use with corresponding census data.

The utility of these vital statistics for States and cities for the evaluation of the coverage of the Hispanic population in 1970 is limited. The data are not adequate to develop an expected population even for the specified areas because of the short time span covered and the lack of corresponding data on migration. However, various demographic measures that can provide general indications of the overall quality of the data on the Hispanic population, such as life table measures, can be calculated from the data for some of these areas.

Vital statistics tabulated for Puerto Rico are another useful type of demographic information. Birth and death rates are available for several decades and life tables have been compiled periodically since the early part of the century. These data can serve as bench marks against which various data and measures for the Puerto Rican population and other Hispanic groups in the United States can be compared.

Non-Census Data: Immigration Data

The Immigration and Naturalization Service (INS) provides information on the number of alien immigrants admitted to the United States classified by age, sex, country of birth, and State (or city) of intended residence, as well as a number of administrative categories. These data are available at least for several decades and countries of Spanish language can be identified. This type of data would be useful for deriving an expected national Hispanic population if comparable data on alien emigration, citizen arrivals, citizen departures, and births and deaths were available. These data are lacking in general and cannot be estimated closely enough for use in deriving definitive measures of census coverage for the Hispanic population in 1970. However, illustrative estimates based on the available immigration data are presented in a subsequent section for the population of Cuban birth. Production of these coverage estimates did require a number of unsupported assumptions regarding survival rates, age and sex structure, and emigration because of the lack of suitable data.

Data on arrivals and departures are available for Puerto Rico for each month since January 1959 from the Puerto

Rico Planning Board. Prior to 1970 most such movement was destined for or originated in New York. Combined with birth and death statistics for Puerto Ricans in New York City and State, these data constitute the best set of demographic data on any of the Spanish sub-populations independent of the census. Because these data apply only to a local area, however, information on internal migration of the U.S. Puerto Rican population (i.e., net in-migration or out-migration for New York) is also required to develop an estimate of the expected Puerto Rican population for this area in 1970. Such data are not available from sources other than the census, and the census data pertain only to the 1965-70 period as a whole or represent "lifetime" migration. The data on Puerto Rican passenger traffic and census data on 1965-70 migration to and from Puerto Rico have been used to estimate coverage of the population of Puerto Rican birth or parentage for the entire United States in 1970. (See the section, "Intercensal cohort analysis.") The lack of satisfactory survival rates and particularly of satisfactory data on the age and sex structure of the migrants necessitated making a number of unsupported and untestable assumptions which render any coverage estimates for the Puerto Rican population illustrative rather than definitive.

The measurement of the net immigration of the Hispanic population is rendered especially difficult by the possibility of a substantial illegal immigration of persons of Hispanic origin for which there are no reliable data or estimates.²⁸ The presence in the United States in 1970 of many illegal residents of Hispanic origin who entered in the several years just prior to the 1970 census is widely assumed.²⁹ However, their number is not known and may be unknowable, except in impractically broad limits. The available material, both analytic and conjectural, supports the view that the number of illegal aliens in the United States in 1970 was substantially smaller than in recent years.

The possibly large numbers of illegal aliens of Hispanic origin in the country in 1970 and the difficulties of estimating the size of this segment of the Hispanic population present serious obstacles to the development of reliable estimates of coverage for the Hispanic population in 1970. This issue will remain for 1980. (See the section, "Prospects for Development of Data" for further discussion of illegal aliens.)

Non-Census Data: Administrative Record Data

There are a few other types of data which could prove useful in estimating the coverage of the Hispanic population. Some States and localities compile data on school enrollment for the Spanish-surname population. Use of these data requires considerable caution because of variations in Spanish-surname lists, coding practices, and coding quality, as mentioned earlier.

²⁸ Charles B. Keely, "Counting the Uncountable: Estimates of Undocumented Aliens in the United States," *Population and Development Review*, Volume 3, No. 4, December 1977, pp. 473-482.

²⁹ Domestic Council Committee on Illegal Aliens, *Preliminary Report*, December 1976.

Spanish ancestry is not identified in any way in the Social Security, Medicare, or Internal Revenue Service records, but it might be possible to code a sample of the records for the Southwestern States in 1970 according to the Census Bureau's Spanish-surname list. These data could then be used in the aggregate or, more effectively, in a (case-by-case) match study, to evaluate the coverage of the Spanish-surname population in the Southwestern States. The required coding has not been done and would be extremely expensive to carry out at this time. Such a match study could establish whether an individual was included in the census, but it could not establish whether he or she was included in the Spanish-surname count. The limited geographic applicability of this identifier in its present form would still make additional information for other States necessary.

None of the various non-census data which are available meet the criteria set forth earlier for use in evaluation of the coverage of the Hispanic population: independence from the census, national scope, complete or measurable coverage, and agreement with a census identifier of the Hispanic population. Thus, definitive estimates of coverage for the Hispanic population in 1970 are precluded. However, with appropriate demographic analysis almost all of the data can provide some information regarding coverage.

GENERAL INDICATORS OF ERRORS IN AGE AND SEX DATA

The general overall quality of 1970 census data on the Hispanic population can be evaluated through the use of certain limited techniques of demographic analysis even if precise estimates of coverage cannot be prepared. The tech-

niques that have been applied include an examination of the internal consistency of the data, mainly with regard to age and sex reporting. The results of this type of analysis essentially indicate general patterns and types of errors in the data, but they are sometimes useful in identifying specific age-sex groups which are strongly affected by coverage and reporting errors.

Heaping Indexes

Myers' heaping index is used to measure "age heaping," or the tendency of respondents to report ages with certain terminal digits (e.g., zeros, fives) at the expense of others.³⁰ The method also provides rough minimal indications of the proportion of the population misreporting on each terminal digit. Measures of heaping are considered here because high levels of misreporting in single ages are usually associated with high levels of misreporting of age groups and of omissions. The indexes and proportions are shown in table 5 for the Spanish-origin population in 1970, along with the corresponding figures for the total, White, and Black populations.

Myers' index for the Spanish-origin population in 1970 (0.6) is very low. This value is about the same as the value for the White population in 1970 (0.5) and well below the figure for the Black population (1.5). Myers' index and the proportions misreporting on each terminal digit indicate little or no digital preference in reporting ages on the part of the Spanish-origin population in 1970. In fact, the results

³⁰ U.S. Bureau of the Census, *The Methods and Materials of Demography*, 2 vols. by Henry S. Shyrock, Jacob S. Siegel, and Associates, third printing, 1975, esp. Vol. 1, p. 207.

Table 5. Percent of Blended Population With Ages Ending in Each Terminal Digit 0 to 9 and Myers' Summary Index of Heaping, for the Spanish-Origin, White, and Black Populations of the United States: 1970

(Percentages were obtained by Myers' blended method, using ages 10 to 79, and should be compared with expected values of 10.0)

Terminal digit	Spanish-origin population			Total population	White population	Black population
	Total	Male	Female			
0.....	10.1	10.0	10.2	10.0	10.0	10.6
1.....	9.6	9.5	9.7	9.7	9.7	9.5
2.....	10.0	9.9	10.0	10.0	10.0	9.8
3.....	9.9	9.9	9.8	10.0	10.0	9.6
4.....	10.0	9.9	10.0	9.8	9.8	9.9
5.....	10.2	10.3	10.1	10.0	10.0	10.2
6.....	10.0	10.1	9.9	10.0	10.0	9.9
7.....	10.2	10.2	10.2	10.3	10.3	10.3
8.....	9.9	10.1	9.8	10.1	10.1	9.8
9.....	10.1	10.0	10.2	10.1	10.0	10.3
Summary index ¹ .	0.6	0.7	0.7	0.6	0.5	1.5

¹Summary index is one-half the sum of the absolute values of deviations from the expected value of 10.0; i.e., summary index = $\frac{1}{2} \sum |p_a - 10.0|$.

for the Spanish-origin population are within the range of error of the measurement device and are consistent with no heaping at all.

Age Ratios

More directly relevant to the measurement of coverage is the quality of data for age groups. One method of assessing the reporting and coverage of grouped data on age is to calculate so-called age ratios and an accompanying summary index.³¹ Substantial deviations of the age ratios from 100.0 point to age groups which may be overreported or underreported at the expense of adjacent groups and/or which may be underenumerated. The age ratios shown in table 6 for the Hispanic population in 1970, defined in terms of Spanish origin and Spanish surname, identify some age

³¹ An age ratio is defined here as $\frac{5P_a}{1/3 (5P_{a-5} + 5P_a + 5P_{a+5})} \times 100$, that is, the ratio of the population in an age group to one-third of the population in the three age groups centered on the numerator population, expressed per 100.

groups that appear to have coverage problems. The corresponding age ratios for the White and Black populations in 1970, corrected for net census undercounts, are shown in the table for comparison.

The 5-9 age group shows ratios greater than 105 for both Hispanic populations reported in table 6. These figures may indicate greater undercoverage of the 0-4 and 10-14 age groups than the 5-9 age group. The very low ratios for males aged 20-24 suggest possibly large net undercounts in this age group. The low ratios for ages 50-54, coupled with the relatively high ratios for ages 45-49 and ages 55-59, suggest substantial age misreporting in this age range, if not also differences in coverage from age group to age group. Likewise, the high ratios for ages 65-69, when considered in combination with the much lower ratios for the adjacent age groups, suggest substantial misreporting into the 65-69 age group at the expense of the adjacent age groups. On the other hand, no firm meaning can be attached to the deviant age ratios because of the distorting effect of past fluctuations in numbers of births and of migration flows into and out of the country. Even the White population corrected

Table 6. Age Ratios and Age-Accuracy Indexes for the Spanish-Origin, Spanish-Surname, White (Corrected), and Black (Corrected) Populations of the United States, by Sex: 1970

(An age ratio is defined as $\frac{3P_a}{P_{a-5} + P_a + P_{a+5}} \times 100$)

Age (years)	Spanish-origin population		Spanish-surname population ¹		White population (Corrected)		Black population (Corrected)	
	Male	Female	Male	Female	Male	Female	Male	Female
5 to 9.....	105.4	105.2	105.1	105.4	104.0	104.0	103.8	103.6
10 to 14.....	102.5	101.7	103.6	102.6	103.8	103.5	104.0	103.7
15 to 19.....	101.4	99.1	104.3	102.2	102.2	100.4	102.6	101.4
20 to 24.....	94.4	99.8	91.7	98.2	98.6	102.7	94.8	98.5
25 to 29.....	98.6	97.3	98.2	95.7	100.1	98.4	99.0	97.4
30 to 34.....	99.2	100.1	97.1	97.6	94.7	94.9	95.8	96.2
35 to 39.....	99.5	99.5	99.2	99.2	96.7	96.1	99.1	98.6
40 to 44.....	103.7	102.7	104.0	104.1	101.9	101.5	102.0	101.7
45 to 49.....	102.6	101.7	105.2	102.5	103.9	104.1	102.4	102.2
50 to 54.....	92.7	92.7	91.4	93.3	99.9	99.6	97.9	98.0
55 to 59.....	99.8	101.8	99.0	100.7	101.2	100.6	102.7	102.7
60 to 64.....	97.4	97.6	99.3	97.6	102.4	102.9	101.2	102.4
65 to 69.....	105.3	103.5	104.9	106.2	97.3	97.1	95.5	94.1
70 to 74.....	93.2	94.2	94.8	92.2	98.4	100.9	98.4	101.0
75 to 79.....	95.8	95.7	91.2	96.2	101.6	103.9	98.2	101.9
Deviations from 100, Irrespective of sign								
Sum of deviations....	50.3	40.8	65.2	53.7	35.4	38.4	40.1	37.8
Mean deviation.....	3.4	2.7	4.3	3.6	2.4	2.6	2.7	2.5

¹Five Southwestern States only.

for net census errors shows great irregularities in the age ratios and these irregularities may be taken as true reflections of the age patterns of this population.

Age-Sex Accuracy Indexes

Age ratios such as those just described can be combined with one another over the entire age range and with sex ratios in various ways to obtain summary measures of errors in census data on age and sex. These can then be used to assess the general quality of the data. Three such indexes, Das Gupta's age-sex accuracy index,³² a simple age-accuracy index,³³ and the United Nations' age-sex accuracy index³³ are shown in table 7 for a variety of population groups.

Caution should be observed in interpreting these indexes. They are all based on assumptions of smooth age structures

³² Ajit Das Gupta, "Accuracy Index of Census Age Distributions," *Proceedings of the World Population Conference, 1954 (Rome)*, Vol. IV, United Nations, N.Y., 1955, pp. 63-74.

³³ *The Methods and Materials of Demography*, op. cit., esp. Vol. 1, pp. 222-223.

and small, regular changes in sex composition over the age span. The first assumption does not apply very well to the total population of the United States, which has been affected by sharp fluctuations in the number of births over the last several decades. Populations affected by substantial immigration or emigration, such as the population of Cuban origin in 1970 or the population of Puerto Rican birth or parentage in 1960, are especially unsuitable for the application of these age-sex indexes. The native Hispanic population of foreign parentage meets the assumptions of the indexes better than the total Hispanic population (i.e., including the foreign born). At best, the measures identify the levels and variations in errors in census age-sex data only roughly.

The summary indexes of errors in age-sex composition suggest that the 1970 census data for various Hispanic populations are generally somewhat less accurate than the 1970 census data for Whites and Blacks (table 7). Das Gupta's index for the Spanish-origin population in 1970 (2.1) is larger than those for the White population (0.6) or the

Table 7. Summary Measures of Errors in Age and Sex Data for Selected Hispanic, White, and Black Populations of the United States: 1970 and 1960

Population	Das Gupta's Grouped Age-Sex Accuracy Index ¹	Age-Accuracy Index	United Nations Age-Sex Accuracy Index ²
Spanish origin, 1970.....	2.1	3.0	18.7
Mexican origin, 1970.....	4.1	4.3	23.3
Spanish surname ³			
1970.....	3.0	4.0	21.8
1960.....	3.4	4.2	21.1
Puerto Rican birth or parentage			
1970.....	2.7	3.3	22.2
1960.....	6.2	4.9	29.8
White, 1970			
Enumerated.....	0.6	2.2	16.0
Corrected.....	0.7	2.5	17.4
Black, 1970			
Enumerated.....	0.6	3.2	17.0
Corrected.....	0.8	2.6	17.6

¹Das Gupta suggests describing census data as "accurate," "inaccurate," or "highly inaccurate" depending on whether the index is under 5, 5 to 15, or over 15.

²The United Nations describes census data as "accurate," "inaccurate," or "highly inaccurate" depending on whether the index is under 20, 20 to 40, or over 40.

³Five Southwestern States only.

References: U.S. Bureau of the Census, *The Methods and Materials of Demography*, by H.S. Shryock, J.S. Siegel, and Associates, Third Printing (rev.), 1975, pp. 218-223.

Ajit Das Gupta, "Accuracy Index of Census Age Distributions," *Proceedings of the World Population Conference, 1954 (Rome)*, United Nations, Vol. IV, 1955, pp. 63-74.

Black population (0.6). However, the value is still quite low and falls well within the range considered by Das Gupta to be "accurate." The index values for the Spanish-surname population and the Puerto Rican population in 1970 are somewhat higher, but are still in the "accurate" range. The Spanish-surname population shows about the same level of accuracy in the 1960 census as in the 1970 census. On the other hand, the population of Puerto Rican birth or parentage shows substantial improvement between the two censuses. In 1960, the population of Puerto Rican birth or parentage was largely of Puerto Rican birth, i.e., it consisted mainly of immigrants. The large proportion of immigrants affected the age-sex structure sufficiently to produce a relatively large value for the summary measure. Under these circumstances, the measure is not wholly indicative of reporting or coverage errors. The factor of immigration probably also accounts for the larger index value for the Mexican-origin population in 1970.

The age-accuracy index shows a general pattern similar to Das Gupta's index. The indexes for the Spanish-origin population and the Black population in 1970 (3.0 and 3.2, respectively) are about the same and relatively small (table 7). This measure suggests less irregularity in the reporting and coverage of Spanish-origin females (2.7) than males (3.4); furthermore, the index for Spanish-origin females is about the same as that for the White female and Black female populations corrected for net census errors. (See table 6.) The United Nations' age-sex accuracy index is slightly higher for the Spanish-origin population (19) than for Whites (16) or Blacks (17) in 1970. However, all three values are below 20 and thus fall in the "accurate" range. The United Nations' index values for the other Hispanic populations reported in table 7 are at or just above 20, with the exception of the much higher value for the population of Puerto Rican birth or parentage in 1960 (30). Again, heavy recent immigration and annual fluctuations in the number of births probably account for the relatively high level of these indexes.

These rough measures of error generally indicate that the data for the various Hispanic populations in 1970 are of fairly good quality. No gross irregularities in reporting or coverage of age groups are apparent in any of the populations. The measures of errors in age data do, however, point to a few age-sex groups in the Hispanic population that may have substantially larger coverage or reporting errors than the rest, in particular, males aged 20-24 and the age groups 50-54 and 65-69.

It is doubtful whether one can draw any clear inferences from these figures regarding the relative accuracy of census data for Hispanics, Whites, or Blacks. In fact, these figures are quite inconsistent with the estimates of relative coverage error for Whites and Blacks derived by direct demographic analysis.

Census Survival Ratios

Analysis of so-called national census survival ratios may be helpful in revealing errors in census age data. Census survival ratios for a population group measure jointly the effects of

both mortality during an intercensal period and shifts in net census errors for age cohorts in the two censuses. As such, census survival ratios should be calculated for populations not subject to immigration or emigration during the intercensal period or should be adjusted to exclude net immigration (or to include net emigration) during the period. The computation of census survival ratios for a population requires, at a minimum, data distributed by age for the population from two censuses. For the 1960 and 1970 censuses, the required age data are available for the Spanish-surname population of the five Southwestern States, the population of Puerto Rican birth or parentage, and the first and second generations of Mexican stock.³⁴

Adequate census survival ratios cannot be computed even for all of these population groups because of the lack of appropriate data on net immigration (or net internal migration for the Spanish-surname population.) The native population of Mexican parentage can be treated as an approximately closed population (i.e., unaffected by international migration); hence, satisfactory census survival ratios can be computed for it. For the native population of Puerto Rican parentage, adjustments for net immigration can be made; hence, satisfactory census survival ratios can be calculated for this group, too. Appropriate data for making migration adjustments for the Spanish-surname population and for the population of Mexican birth are not available.

The census survival ratios shown in table 8 reflect coverage and age-reporting errors in combination, for age cohorts in the 1960 and 1970 censuses. If both of these censuses were free of coverage or age-reporting errors, the census survival ratios would represent mortality only. They would then exhibit a characteristic pattern similar to that shown by life table survival rates; i.e., all rates would fall below 1.00, the rates would show a smooth decline with increasing age, and the male-female ratios of the rates would be less than 1.00 and shift downward generally with increasing age. (See table 8 for an example based on the 1965 U.S. life tables for Whites and Black-and-other-races.) Deviations from the "expected" pattern, represented by an unweighted average of the survival rates from the White and Black-and-other-races life tables, may be taken as suggestive of problems in the data.

Table 8 shows the deviations of the census survival ratios for the native populations of Mexican and Puerto Rican parentage from the average life table survival rates. The national census survival ratios for the White and Black populations provide a further basis for comparison and analysis of the census survival ratios for the Hispanic populations. Because of the assumptions relating to migration made in the computation of the census survival ratios, differences between the ratios for the Hispanic populations and those for the U.S. life table populations must be interpreted with caution, however.

³⁴ Tabulations by age and sex are not available from the 1960 census for the first and second generations of other Hispanic populations.

Table 8. Deviation of Census Survival Ratios for Selected Hispanic, White, and Black Populations from Life Table Survival Rates, by Sex: 1960 to 1970

(Differences computed from unrounded figures)

Sex and age (years)		Census survival ratios ¹					Deviation from life table survival rate					
		Native of Mexican parentage	Puerto Rican birth or parentage	Native of Puerto Rican parentage ²	White	Black	Life table survival rates, 1965 ³	Native of Mexican parentage ⁴	Puerto Rican birth or parentage ⁴	Native of Puerto Rican parentage ⁴	White ⁵	Black ⁶
In 1960	In 1970											
MALE												
0 to 4.....	10 to 14.....	1.225	1.004	1.029	1.002	1.021	.992	+.232	+.012	+.037	+.008	+.031
5 to 9.....	15 to 19.....	1.175	.993	1.016	1.005	.999	.992	+.183	+.001	+.024	+.011	+.007
10 to 14.....	20 to 24.....	.970	.835	1.083	.987	.912	.985	-.016	-.150	+.098	-.001	-.071
15 to 19.....	25 to 29.....	.931	1.271	1.192	.973	.894	.978	-.047	+.293	+.214	-.011	-.078
20 to 24.....	30 to 34.....	1.084	1.173	.982	.984	.958	.973	+.111	+.200	+.009	+.000	-.004
25 to 29.....	35 to 39.....	1.024	1.054	1.113	.980	.955	.966	+.058	+.088	+.147	-.002	+.004
30 to 34.....	40 to 44.....	.974	.967	.980	.972	.939	.953	+.020	+.014	+.027	-.002	+.006
35 to 39.....	45 to 49.....	.976	.904	.959	.948	.892	.933	+.043	-.029	+.026	-.010	-.017
40 to 44.....	50 to 54.....	.897	.954	.797	.933	.884	.902	-.005	+.052	-.105	+.002	+.010
45 to 49.....	55 to 59.....	.884	.901	1.034	.885	.829	.857	+.027	+.044	+.177	-.004	+.004
50 to 54.....	60 to 64.....	.857	.925	.934	.845	.819	.797	+.059	+.128	+.137	+.014	+.056
55 to 59.....	65 to 69.....	.841	.826	.928	.750	.777	.714	+.128	+.113	+.214	-.004	+.105
60 to 64.....	70 to 74.....	.820	.752	(B)	.675	.699	.613	+.206	+.139	(B)	+.016	+.132
65 and over.....	75 and over.....	.503	.615	(B)	.389	.379	.390	+.113	+.225	(B)	+.016	-.028
FEMALE												
0 to 4.....	10 to 14.....	1.239	.969	1.012	.997	1.015	.994	+.246	-.025	+.018	+.001	+.023
5 to 9.....	15 to 19.....	1.179	.942	.998	1.007	1.004	.996	+.183	-.054	+.002	+.010	+.009
10 to 14.....	20 to 24.....	.993	.846	1.062	.998	.970	.994	-.001	-.148	+.069	+.003	-.022
15 to 19.....	25 to 29.....	.942	1.280	1.340	.989	.994	.990	-.049	+.290	+.349	-.005	+.007
20 to 24.....	30 to 34.....	1.095	1.272	1.254	.996	1.028	.986	+.109	+.286	+.268	+.004	+.048
25 to 29.....	35 to 39.....	1.060	1.110	1.072	.994	1.009	.980	+.081	+.130	+.092	+.004	+.039
30 to 34.....	40 to 44.....	.970	1.004	.959	.989	.970	.970	+.000	+.034	-.011	+.004	+.014
35 to 39.....	45 to 49.....	.960	1.019	.954	.968	.914	.957	+.003	+.062	-.003	-.008	-.024
40 to 44.....	50 to 54.....	.949	1.038	1.029	.964	.910	.939	+.010	+.099	+.090	+.002	-.006
45 to 49.....	55 to 59.....	.949	.982	1.179	.939	.871	.912	+.037	+.070	+.266	-.005	-.010
50 to 54.....	60 to 64.....	.897	1.110	1.068	.936	.902	.873	+.024	+.237	+.194	+.017	+.074
55 to 59.....	65 to 69.....	.842	1.001	1.108	.891	.928	.815	+.027	+.186	+.294	+.015	+.174
60 to 64.....	70 to 74.....	.968	.839	(B)	.837	.808	.743	+.225	+.096	(B)	+.029	+.129
65 and over.....	75 and over.....	.684	.684	(B)	.509	.466	.461	+.223	+.223	(B)	+.059	-.006

B Base less than 500.

¹Male population adjusted to include Armed Forces overseas in 1960 and 1970.

²For calculation of census survival ratios, the native population of Puerto Rican parentage in 1960 and 1970 includes persons enumerated in Puerto Rico and born in the United States.

³Average of White and Black-and-other-races survival rates.

⁴Standard is average of White and Black-and-other-races survival rates for 1965 (column 6).

⁵Standard is 1965 U.S. White life table survival rates (not shown).

⁶Standard is 1965 U.S. Black-and-other-races life table survival rates (not shown).

Source of life tables: National Center for Health Statistics, *Vital Statistics of the United States, 1965, Vol. II - Mortality, Part A, 1967, p. 5-4.*

Census Survival Ratios: Native Population of Mexican Parentage

The census survival ratios for the native population of Mexican parentage show patterns roughly similar to those of Whites and Blacks but the ratios for the Hispanic group are more extreme and irregular. The census survival ratios for both male and female natives of Mexican parentage for ages 10-14 and 15-19 in 1970 are much larger than 1.00. These figures can be explained by better coverage of the population at ages 10-19 in 1970 than at ages 0-9 in 1960. This pattern may also be accounted for by an increased tendency for persons born in Mexico to misreport their place of birth as the United States.

The census survival ratios for native males and females of Mexican parentage are well below 1.00 at ages 25-29 in 1970, much greater than 1.00 at ages 30-34 in 1970, and relatively close to 1.00 at ages 20-24. This pattern of census survival

ratios suggests lower coverage rates for ages 25-29 than for the surrounding ages in the 1970 census. The particularly high census survival ratios for ages 30 to 39 in 1970 indicate that coverage errors for ages 20 to 29 in 1960 may have been especially serious. Furthermore, the substantially lower census survival ratios for Black males ages 20 to 29 in 1970 compared to the census survival ratios for the Mexican-parentage group could indicate that census coverage was worse for Black males in these ages in 1970 than for Mexican-American males.

Other notable differences occur at the older ages. The census survival ratio for native females of Mexican parentage aged 65-69 in 1970 is too low and the ratio for ages 70-74 in 1970 is much too high, in comparison with the White female life table survival rates for 1965 and the ratios for both White females and Black females at these ages in 1970. This pattern is indicative of some age misreporting—either a preference for ages 70-74 at the expense of ages 65-69 in 1970, or a preference for ages 55-59 at the expense of

ages 60-64 in 1960.³⁵ Age misreporting is also possibly indicated for native males of Mexican parentage aged 45-54 in 1970; the census survival ratio for males aged 45-49 appears slightly high and the ratio for males ages 50-54 appears slightly low. The other census survival ratios are similar to those for the White population.

The census survival ratios for the native population of Mexican parentage virtually all exceed those of the standard (table 8). The exceptions occur in age groups adjacent to others which exceed the standard by an exceptionally large amount, suggesting age misreporting for these groups. One possible explanation for the general excess in the ratios is that mortality for the Mexican parentage population was lower during the 1960's than in the standard population. Another, more likely, possibility is that coverage improved over the decade more for persons of Mexican parentage than for the total population (approximately 0.3 percent for persons over 10 in 1970). Other evidence supporting this contention is presented in the subsequent section, "Intercensal cohort analysis."

Census Survival Ratios: Native Population of Puerto Rican Parentage

The derivation of the census survival ratios displayed in table 8 for the native population of Puerto Rican parentage required a large adjustment for migration. This adjustment was made, in effect, by combining the population residing in Puerto Rico and reporting the United States as place of birth with the native population of Puerto Rican parentage residing in the United States in both 1960 and 1970. In each year the overseas group was about 18 percent as large as the resident group. Because of the nature of the migration adjustment, the survival ratios for the native population of Puerto Rican parentage are even more problematic than the census survival ratios for the Mexican-parentage population. Deficiencies in the adjustment procedure could easily account for much of the deviations from the expected patterns. Errors in reporting place of birth in the census could also be responsible for some of the deviations. Hence, any inferences regarding the net census errors for the population of Puerto Rican parentage based on the census survival ratios in table 8 are to be interpreted merely as reasonable possibilities.

The high census survival ratios for males of Puerto Rican parentage aged 20-29 and 35-39 in 1970 could indicate coverage errors in the 1960 census at ages 10-19 and 25-29. Similarly, the large ratios for males aged 60-69 in 1970

could indicate relatively large coverage errors in 1960 or considerable age misreporting in both censuses. Age misreporting would seem to be more definitely responsible for the low census survival ratio at ages 50-54 in 1970 in combination with the excessive value at ages 55-59. For females of Puerto Rican parentage the ratios are too large relative to those for Whites and Blacks at ages 20-39 (especially ages 25-34) and at ages 50-69. The remaining ratios for both sexes are similar to the expected patterns.

Taken at face value, the 1960-70 census survival rates for the population of Puerto Rican parentage give an indication of some serious coverage problems for this population in the 1970 or 1960 censuses. As was the case for the native population of Mexican parentage, virtually all the ratios for the population of Puerto Rican parentage exceed those for the standard population. As before, this fact could indicate coverage improvements from 1960 to 1970 in excess of those found in the standard population (0.3 percent).³⁶ Again, it should be stressed that, because the adjustment for migration is only approximate, these and other indications, by themselves, cannot be treated as definite signs of serious errors in the data or of the absence of serious errors.

Census Survival Ratios: Population of Puerto Rican Birth or Parentage

If we consider the entire Puerto Rican population of the United States, both persons of Puerto Rican birth and persons of Puerto Rican parentage, another possibility for adjusting census survival ratios for migration is to exclude survivors of net migration during the intercensal period from the figures for the second census. The monthly figures on net arrivals and departures between the United States and Puerto Rico can be used to adjust the census survival ratios for the migration component. These data themselves required a substantial amount of adjustment for errors and allocations for unknown characteristics. Unfortunately, the magnitudes of some of the adjustments are sufficiently great that the general patterns and levels of the ratios shown in table 8 could be almost solely attributable to the adjustments themselves rather than to mortality or changes in census coverage.³⁷ Nonetheless, we shall examine these census survival ratios for what indications of coverage errors they can provide.

The census survival ratios for both sexes at ages 25-39 in 1970 are much too large relative to those for the standard population and the other populations shown in table 8. These large values are partially complemented by ratios which are too small in the preceding age group 20-24. This pattern is suggestive of either age misreporting in one or both censuses or, more likely, errors in the procedures for allocating net migration to age and sex groups. Census survival ratios for Puerto Rican females aged 10-19 in 1970

³⁵ Age misreporting of both types is likely to have occurred. Heaping indexes computed for other populations show a preference for ages ending in the digit nine in 1960 because the question on age asked only for year of birth. An unusual concentration at age 59, corresponding to year of birth 1900 was further noted. For 1970, the more usual form of age heaping on zeros and fives was again found as the question format included both age and year of birth. Age heaping in recent U.S. censuses has been more pronounced at the older ages so that the pattern of age misreporting hypothesized is consistent with the pattern of survival ratios noted. (See U.S. Bureau of the Census, *Census of Population: 1970, Volume 1, Characteristics of the Population, Part 1, United States Summary—Section 2*, 1973, p. App-13.)

³⁶ See the section, "Intercensal cohort analysis", for further evidence supporting this assertion.

³⁷ The adjustments and the rationale for making the particular adjustments are discussed in detail in the subsequent section "Intercensal cohort analysis: population of Puerto Rican birth or parentage."

are somewhat lower than those for any population group shown in table 8. Better coverage of ages 0-9 in the 1960 census than ages 10-19 in 1970 is not a very appealing or likely explanation as young children tend to be among the age groups with the worst coverage and teenagers among those with the best. However, overstatement of the mortality of these cohorts between 1960 and 1970 or errors in the procedures for allocating migration offer a better explanation for the observed pattern.

At ages over 50 for males and over 30 for females in 1970, the census survival ratios for the Puerto Rican birth or parentage population all exceed those for the standard population. Furthermore, at ages over 60 for both sexes the amount of the excess is large. As was mentioned in the preceding sections, this pattern of excess census survival rates is indicative of coverage improvements from 1960 to 1970 greater than 0.3 percent,³⁸ if it is assumed that the adjustments for intercensal net migration are accurate or at least approximately correct.

Age-Specific Death Rates and Life Expectation

Analysis of age-specific death rates and life table functions computed from these deaths rates for Hispanic populations

³⁸ Further discussion, including more detailed evidence can be found in the subsequent section entitled "Intercensal cohort analysis: population of Puerto Rican birth or parentage."

can provide some evidence of coverage and reporting errors in the census data for specific age groups as well as indications of the overall quality of the census data. Mortality data for Hispanic populations are not widely available. The Texas State Department of Health provides tabulations of deaths classified by age for the Spanish-surname (and White non-Spanish-surname) population which can be used with the corresponding census data to compute age-specific death rates for the Spanish-surname (and White non-Spanish-surname) population of Texas. Age-specific death rates were computed with deaths of Spanish-surname persons (and White non-Spanish-surname persons) for 1970 as numerators and data for the Spanish-surname (and White non-Spanish-surname) population of Texas taken from the 1970 census as denominators.³⁹ These rates are shown in table 9, along with age-specific death rates for the White population of the United States in 1970 and death rates from one of the Coale-Demeny model life tables, specifically West model life table, level 22.⁴⁰

³⁹ The tabulations of deaths were available only in 10-year age groups above age 15; accordingly, the deaths were subdivided into 5-year groups by means of Newton's method (*The Methods and Materials of Demography*, op. cit., pp. 222-223). The population data were taken from U.S. Bureau of the Census, 1970 Census of Population, Subject Reports PC(2)-1D, Persons of Spanish Surname, 1973.

⁴⁰ Ansley J. Coale, and Paul Demeny, *Regional Model Life Tables and Stable Populations*, Princeton University Press, 1966.

Table 9. Age-Specific and Age-Adjusted Death Rates for the Spanish-Surname Population of Texas, 1970, and Other Selected Populations, by Sex

(Rates per 1,000 population)

Age (years)	Male					Female				
	Texas, 1970		United States, 1970		West model life table (Level 22) (e ₀ =68.6)	Texas, 1970		United States, 1970		West model life table (Level 22) (e ₀ =72.5)
	Spanish surname (e ₀ =67.2)	White, non-Spanish surname (e ₀ =68.1)	White (e ₀ =68.1)	Black and other races (e ₀ =61.3)		Spanish surname (e ₀ =73.4)	White, non-Spanish surname (e ₀ =76.5)	White (e ₀ =75.7)	Black and other races (e ₀ =69.4)	
Less than 1.....	31.3	22.3	21.1	40.2	31.6	25.8	15.9	16.2	31.7	23.1
1-4.....	1.4	1.0	0.8	1.4	1.5	1.1	0.7	0.7	1.2	1.2
5-9.....	0.6	0.5	0.5	0.6	0.7	0.4	0.4	0.3	0.5	0.4
10-14.....	0.5	0.6	0.5	0.7	0.6	0.4	0.3	0.3	0.4	0.4
15-19.....	2.1	1.5	1.5	2.2	1.1	0.6	0.6	0.6	0.8	0.6
20-24.....	3.4	1.9	2.0	4.2	1.5	0.9	0.8	0.7	1.4	0.8
25-29.....	3.1	1.4	1.7	4.6	1.5	0.9	0.7	0.7	1.9	1.0
30-34.....	3.4	2.0	1.9	5.6	1.7	1.3	1.1	1.0	2.5	1.3
35-39.....	3.5	2.7	2.6	7.2	2.2	2.1	1.5	1.5	4.0	1.7
40-44.....	4.1	4.4	4.2	10.2	3.2	2.7	2.2	2.3	5.9	2.5
45-49.....	5.6	7.3	6.8	14.0	5.2	3.8	3.5	3.7	8.3	3.8
50-54.....	10.5	11.6	11.0	19.4	8.3	6.8	5.3	5.6	11.5	5.8
55-59.....	16.0	17.8	17.7	26.4	13.6	9.5	7.2	8.3	16.1	8.9
60-64.....	22.8	25.1	27.1	35.3	21.6	14.5	10.8	12.2	22.2	14.3
65-69.....	34.3	38.9	40.5	47.6	34.3	24.2	17.1	19.2	31.3	24.4
70-74.....	55.1	56.6	58.3	65.6	55.0	42.0	27.2	31.3	44.9	42.3
75-79.....	84.0	82.7	86.9	84.8	88.0	66.5	49.4	53.5	57.8	72.7
80-84.....	109.6	125.9	126.1	98.6	180.6	92.4	79.2	88.7	74.2	162.0
85 and over.....	157.9	179.1	185.5	114.1	180.6	126.2	160.1	159.8	102.9	162.0
Age-adjusted death rate ¹	11.7	12.0	12.3	15.2	11.9	8.3	6.7	7.2	9.9	9.4

¹ Standard population is 1970 United States total White population.

Sources: Texas, Spanish surname population: Computed from death statistics supplied by the Texas State Department of Health and population data from U.S. Bureau of the Census, Census of Population: 1970, Subject Reports PC(2)-1D, Persons of Spanish Surname, 1973, and General Population Characteristics, PC(1)-B45, Texas, 1971, table 20.

United States: U.S. Public Health Service, National Center for Health Statistics, *Vital Statistics of the United States, Vol. II - Mortality, Part A, 1970, 1974, tables 1-8.*

Model Life Table: Ansley J. Coale and Paul Demeny, *Regional Model Life Tables and Stable Populations*, Princeton University Press, 1966.

With few exceptions the age-specific death rates for the male and female Spanish-surname populations of Texas in 1970 are similar (in level and overall pattern) to 1970 death rates for the White, non-Spanish-surname population of Texas and the White population of the United States, and to rates from the West model life table, level 22. Not all of the differences should be taken as indicative of coverage errors. The higher infant death rate for the Spanish-surname population of Texas than for the other populations presumably reflects real differences between the infant mortality of the Spanish-surname population of Texas and the other populations. The relatively low level of the death rates for Spanish-surname males aged 80-84 and Spanish-surname persons of both sexes at ages 85 and over supports the hypothesis that many elderly Mexican-Americans (particularly those born in Mexico) with chronic diseases of later life return to Mexico to spend their last years "at home." On the other hand, the relatively low level of the rates may be an artifact since they are subject to large random fluctuations as a result of the small size of the population involved.

The abnormally high death rates for Spanish-surname males in the age range 15 to 39 may result from the greater incidence of violent and accidental deaths in this population. Another plausible explanation is that these ages suffered large undercounts in the 1970 census which made the denominator of the death rate smaller than the true value and the rate larger. In contrast, the death rates at these and most other ages for the female Spanish-surname population of Texas differ only slightly from those of the other three populations and do not suggest the presence of serious coverage errors among females.

The existence of problems with population data can also possibly be inferred from the corresponding life tables, which summarize the mortality experience implicit in the age-specific death rates for a population. Life tables for the Spanish-surname and White non-Spanish-surname populations of Texas were constructed on the basis of the age-specific death rates shown in table 9 by means of Greville's short-cut method.⁴¹ Measures of expectation of life at birth, age 20, and age 65, taken from these and selected other life tables, are shown in table 10.

The life tables for the Spanish-surname population of Texas in 1970 imply that the mortality experience of this population is roughly equivalent to that of the total White population and the White non-Spanish-surname population of Texas in 1970 and is much better than that of the Black-and-other-races population of Texas in 1970. For example, the expectation of life at birth in 1970 is 70.2 years for the Spanish-surname population, 71.7 years for the (total) White population, and 65.5 years for the Black-and-other-races population. At age 20 similar relationships appear, but at age 65 the groups differ less.

The differences in life expectation between Spanish-surname males and White non-Spanish-surname males of Texas are all quite small: -0.9 year at birth, -0.1 year at age 20, and +0.6 year at age 65 (table 10). Indeed, if some irregularities in the age-specific death rates for Spanish-surname males at ages 15 to 34 are removed, the deficit at birth disappears and the Spanish-surname males have an expectation of life at age 20 which is 0.6 year *higher* than

⁴¹The Methods and Materials of Demography, op. cit., pp.444-445.

Table 10. Expectation of Life at Birth, Age 20, and Age 65 for the Spanish-Surname Population of Texas, 1970, and Selected Other Populations, 1970 and 1969-71

Population and year	At birth			At age 20			At age 65		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
TEXAS, 1969-71									
Spanish surname ¹	70.2	67.2	73.4	53.2	50.4	56.0	15.3	14.1	16.4
Spanish surname (adjusted) ^{1 2}	70.5	68.1	73.4	53.3	51.1	56.0	15.3	14.1	16.4
White, non-Spanish surname ¹	72.2	68.1	76.5	54.3	50.5	58.3	15.8	13.5	17.9
White.....	71.7	67.8	75.9	54.0	50.4	57.8	15.5	13.3	17.5
Black-and-other-races.....	65.5	61.7	69.5	48.7	45.2	52.3	14.9	13.3	16.5
UNITED STATES, 1969-1971									
All races.....	70.7	67.0	74.6	53.0	49.5	56.6	15.0	13.0	16.8
White.....	71.6	67.9	75.5	53.7	50.2	57.2	15.1	13.0	16.9
Black-and-other-races.....	65.0	61.0	69.0	48.1	44.4	51.8	14.5	12.9	16.0

¹1970 only.

²Age-specific death rates for ages 15-34 (males) and 35-39 (females) were smoothed graphically.

Sources: United States: U.S. Public Health Service, National Center for Health Statistics, United States Life Tables: 1969-71, 1975.

Texas, White and Black-and-Other-Races: U.S. Public Health Service, National Center for Health Statistics, State Life Tables: 1969-71, 1977.

Texas, Spanish-surname population: Computed from death statistics supplied by the Texas State Department of Health and population data from U.S. Bureau of the Census, Census of Population: 1970, Subject Reports PC(2)-1D, Persons of Spanish Surname, 1973.

for White non-Spanish-surname males. On the other hand, the deficits for females are not negligible at any age: 3.1 years at birth, 2.3 years at age 20, and 1.5 years at age 65. Such differences are probably not caused primarily by coverage errors; they probably reflect real deficits in life expectancy for the most part.

Life tables are available for various "Hispanic" countries and regions, such as Mexico and Puerto Rico. However, the mortality experience depicted in these tables is quite different from that of the Spanish-surname population of Texas. Life expectation at birth in 1970 for Mexico was 61.4 years,⁴² well below that computed for the Spanish-surname population of Texas for the same year. For Puerto Rico, life expectation at birth in the 1969-71 life table was 72.0 years, but the distribution of deaths by cause of death in Puerto Rico is very different from the distribution of deaths for the U.S. population of Puerto Rican birth.⁴³ Thus, the mortality level of the Hispanic population in the United States, as summarized in the life tables for Texas, appears to be more similar to the mortality level of the rest of the U.S. population than to the mortality level in various Hispanic countries of origin.

If we can assume that the deaths and the population used to compute the age-specific death rates represent a common population and if we can assume that the deaths are rather completely registered, then these death rates and the corresponding life expectancy figures provide little or no support to the view that the Hispanic population of Texas is greatly underenumerated. Any substantial underenumeration would result in excessively high death rates and excessively low life expectancy values in comparison with the true values. However, the life expectancy figures are already unexpectedly high, in view of the relative socioeconomic positions of Mexican-Americans and Anglos in Texas. It does not seem reasonable to believe that they should be higher. A uniform reduction of 10 percent in the death rates of the Spanish-surname population of Texas, corresponding to a uniform adjustment of the population by 10 percent, for example, would increase life expectation at birth from 70.2 years to about 71.9 years, bringing it to about the level for the (total) White population of Texas in 1970.

Sex Ratio Analysis

A very powerful method of analyzing census figures for coverage and reporting errors is the comparison of observed sex ratios (males per 100 females) for age groups with "expected" sex ratios or sex ratios with known characteristics. A rough set of expected sex ratios for the Hispanic

population is displayed in figure 1. Also shown in figure 1 are observed sex ratios for the Spanish-origin population and observed and expected sex ratios for the White and Black-and-other-races populations in 1970.

The expected sex ratios were obtained by applying 1.05, the assumed sex ratio of births, to the sex ratios of the survival rates from the life table for the Spanish-surname population of Texas in 1970; that is, the male survival rates were divided by the female survival rates and then adjusted upward for the assumed sex ratio of births. Because the mortality level represented in this life table is lower than the actual mortality of older cohorts (since it reflects only mortality in 1970), the survival rates are probably biased upward. On the other hand, this bias is at least partially offset by a downward bias attributable to the smaller gap between the actual male and female mortality in the past. The assumed sex ratio of births was selected after an examination of sex ratios of births for various populations in Latin America and selected Hispanic populations in the United States, such as the Spanish-surname population of Texas and the Puerto Rican population of New York City.

The overall shape of the curve of actual sex ratios for age groups for the Spanish-origin population in 1970 differs only moderately from that of the expected sex ratios based on the life table. At ages 0 to 14, there appears to be a small deficit of the actual sex ratios relative to the expected sex ratios, implying a small relative deficit of males compared with females. However, comparison of sets of sex ratios in the age range 15 to 39 suggests that there is a pronounced relative deficit of males over this age range, with the sex ratios at ages 25 to 34 being almost 15 points lower than the expected values. Over the age range 40 to 59, the shape of the curve of observed sex ratios is similar to the curve of expected sex ratios, but the observed levels are a few points lower. This difference may also indicate a larger undercount of males than females. However, the level of the expected curve may be in error for various other reasons. The assumed sex ratio of births may be too high; the male-female differences in survival rates actually experienced in these and younger ages may have been greater than shown by the life tables used to compute the expected sex ratios; or the sex balance of net immigration may have been more "female" than "male" in these and younger ages.

At ages over 65, the sex ratios observed for the Spanish-origin population are slightly greater than the expected values. This difference could indicate relatively better coverage of Spanish-origin males than females at the older ages. Another possibility, however, is greater emigration of women at these ages. There may have been substantial emigration to Mexico on the part of older persons who have chronic illnesses and who go to Mexico in order to spend their remaining months or years among friends and relatives "at home." The occurrence of this phenomenon is suggested by an examination of the distribution of deaths by cause among Mexican-Americans in the United States. A disproportionate share of deaths at the older ages among Mexican-Americans in Southwestern United States results from violence and acute causes; there are relatively few deaths from chronic

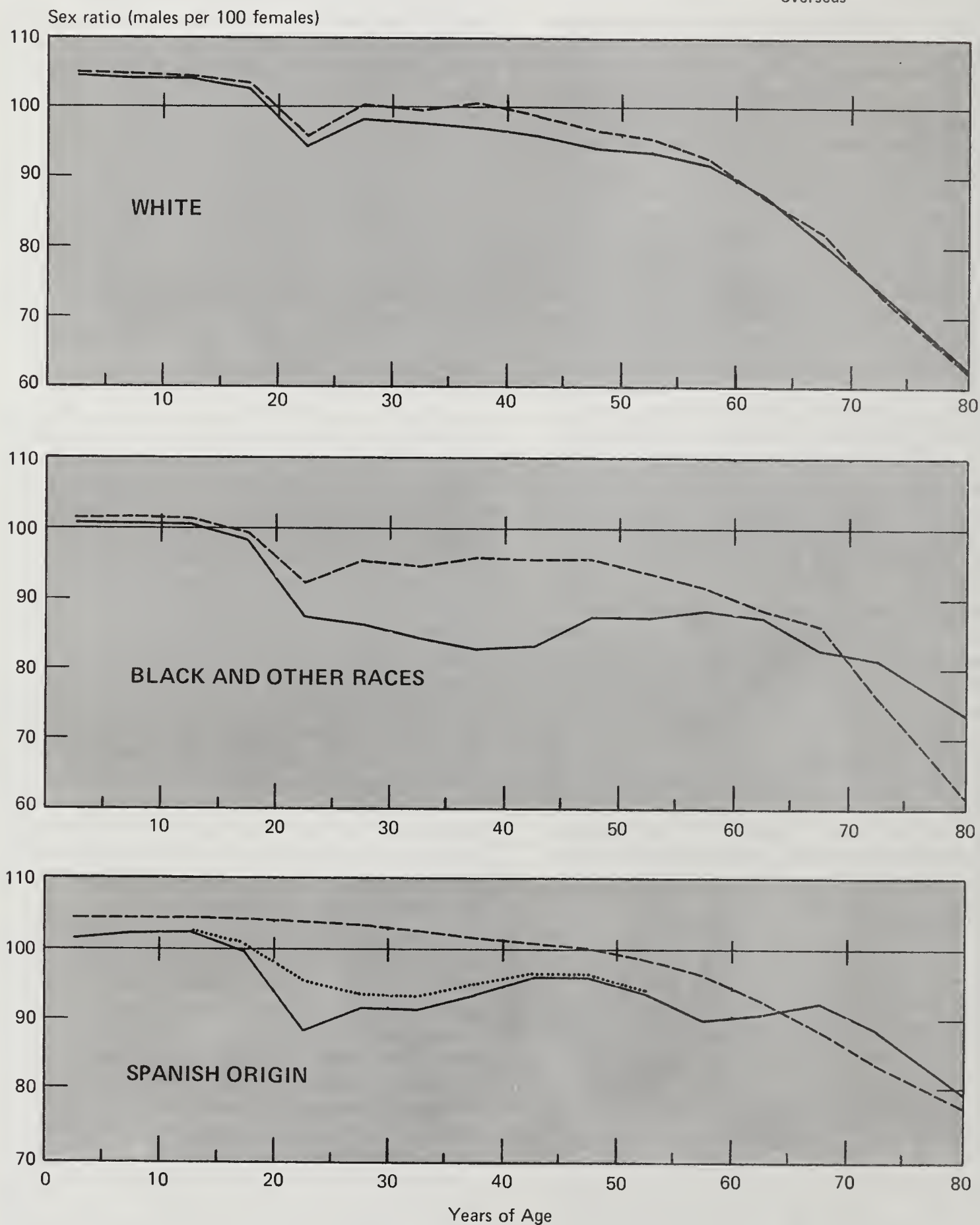
⁴² United Nations, *Demographic Yearbook*, 1973, New York, 1974, pp. 344 and 84. Life expectancies by sex were averaged, using the total population of each sex as weights.

⁴³ The life table was supplied by the Division of Demographic Registry and Vital Statistics, Puerto Rico Department of Health. Cause-of-death statistics for Puerto Rico were taken from: National Center for Health Statistics, *Vital Statistics of the United States*, Volume I, 1970. The distribution of deaths by cause for the U.S. population of Puerto Rican birth is represented by statistics for New York City which apply to the city's population of Puerto Rican birth. The data were supplied by the New York City Department of Vital Statistics.

FIGURE 1.

Observed and Expected Sex Ratios for the
White, Black-and-Other-Race, and Spanish-
Origin Populations, by Age: 1970

— Observed
- - - Expected
..... Observed including
American forces
overseas



Note: Points are plotted at center of each 5-year age interval; last point (age 80) denotes 75 years and over.

causes (e.g., the so-called degenerative diseases).⁴⁴ To the extent that such migration is selective of women and that deaths due to violence and acute causes are more prevalent among males, the observed sex ratios of death rates at the older ages will tend to be elevated. The hypothesis that such return migration or some similar phenomenon frequently occurs is supported also by the fact that, among the various Spanish-origin populations, only the Mexican-origin group exhibits very high sex ratios at the older ages (figure 2).

The sex ratios of the populations classified by the major Hispanic identifiers in 1970 all give roughly the same indications. The curves of the sex ratios for the Spanish-heritage, Spanish-language, and Spanish-surname populations are virtually identical (figure 3). These curves have the same general form as the curve for the Spanish-origin population,

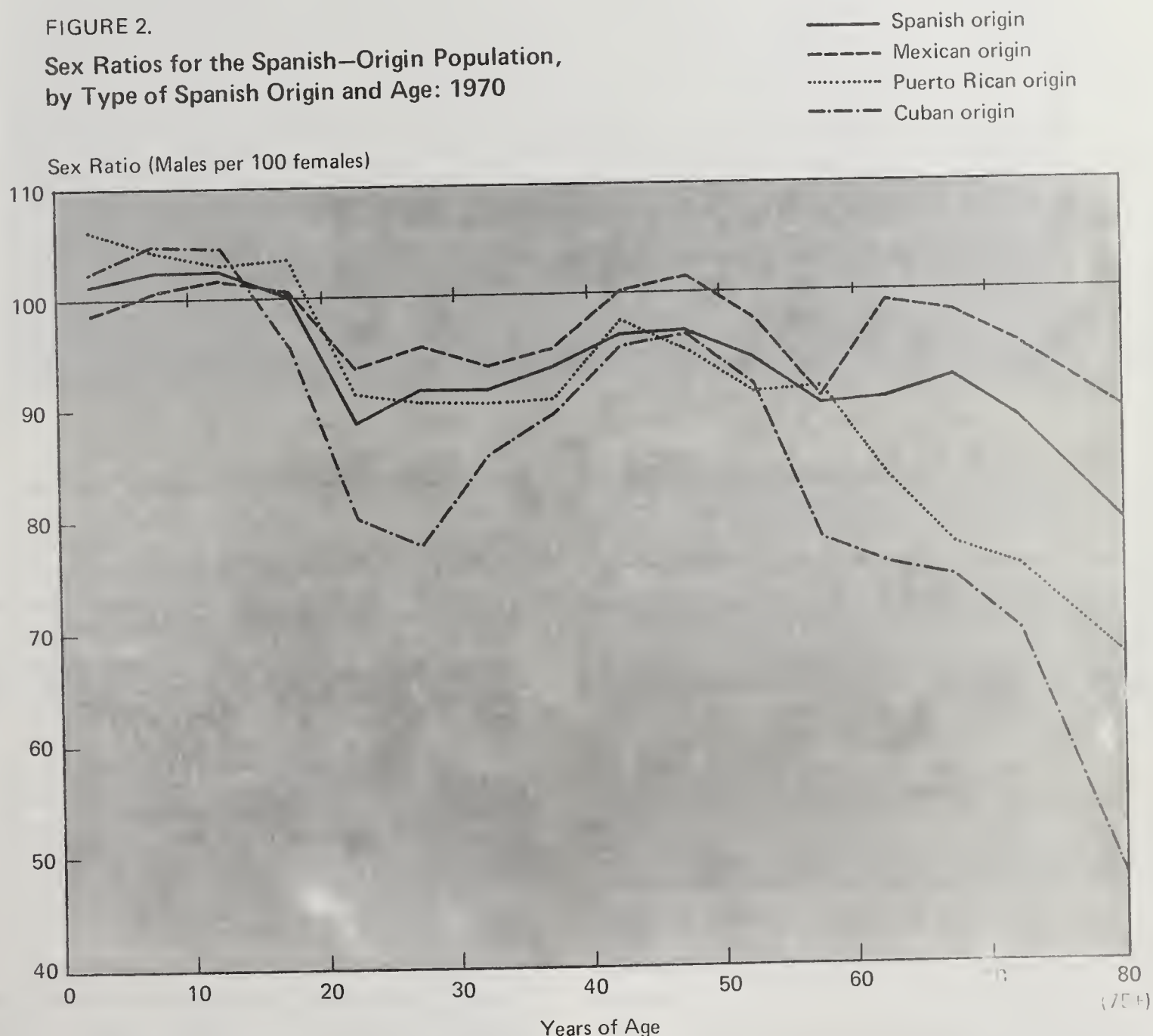
⁴⁴ Benjamin S. Bradshaw and Edwin Fonner, Jr., "The Mortality of Spanish Surnamed Persons in Texas: 1969-71," in Frank D. Bean and W. Parker Frisbie (eds.), *The Demography of Racial and Ethnic Groups*, Academic Press, forthcoming.

although at ages over 25 the Spanish-origin population has somewhat lower sex ratios. This difference may be an indication of a greater tendency for adult females to designate themselves as being of Spanish origin. Another possible explanation for the higher sex ratios in populations identified wholly or partly by surname is the previously mentioned loss of women from the Spanish-surname population through marriage.

The implications of these sex ratios for estimating coverage are the same for the various identifiers. At ages under 20, the various Hispanic populations have sex ratios in 1970 roughly similar to the expected sex ratios. One exception is the sex ratio of the 1970 Mexican-origin population under 5 years of age; the figure is less than 100 and suggests a larger undercount of males relative to the undercount of females at these ages.

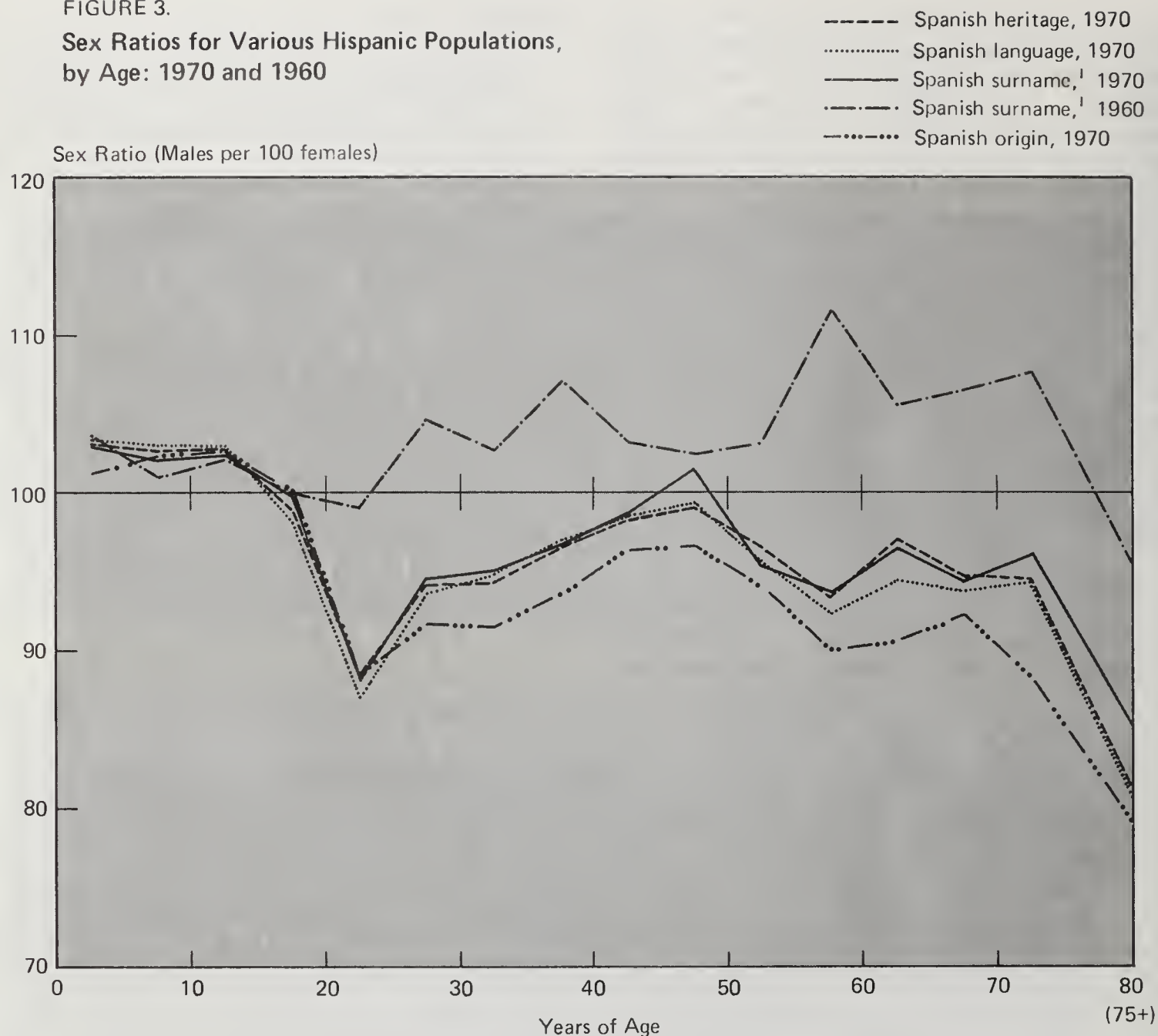
The sex ratios of the various Hispanic populations in 1970 imply a substantial undercount of young adult males regardless of which Hispanic identifier is used. They indicate large

FIGURE 2.
Sex Ratios for the Spanish-Origin Population,
by Type of Spanish Origin and Age: 1970



Note: Points are plotted at center of each 5-year age interval.

FIGURE 3.
Sex Ratios for Various Hispanic Populations,
by Age: 1970 and 1960



¹ Arizona, California, Colorado, New Mexico, and Texas only.

NOTE: Points are plotted at center of each 5-year age interval.

deficits of males relative to females in the age groups 20 to 39. For example, the sex ratio of the Spanish-origin population is about 90 for this age range with the value for the age group 25-29 being only 78. Coverage rates for males aged 25 to 34 years in both the White and Black populations for 1970 are also relatively low (table 11).

The level of the sex ratios of the Hispanic populations in the age range 40 to 59 appears to be slightly low. Exceptions to this pattern occur for the age group 45-49, especially among the Mexican-origin and Spanish-surname populations; for these groups the sex ratio in each case is about 101. This higher sex ratio may be the indirect result of the "bracero" program of the 1950's. In this program Mexican laborers were imported into the United States on a temporary basis. Since most of the laborers were male and many remained in the United States, the population sex ratio may have been significantly raised.

Another basis for analyzing sex ratios of the Hispanic population in 1970 is comparison with sex ratios of groups whose coverage levels are known reasonably well such as the White and Black populations of the United States. The sex ratios of the Spanish-origin population fall between those of the White and the Black-and-other-races populations at ages under 40. In the age range 40 to 59, the sex ratios of the Spanish-origin population continue to exceed those of the Black-and-other-races population, being roughly equal to those of the White population. At ages over 60 the sex ratios of the Spanish-origin population are substantially greater than those of either the White or the Black-and-other-races population.

Analysis of the sex ratios for the various Hispanic populations in 1970 suggests the following tendencies in census coverage. Males appear to be covered less well than females. There appear to be substantial undercounts at the young

Table 11. Preferred Estimates of the Percents of Net Undercount of the Population of the United States, by Sex, Race, and Broad Age Group: 1970 and 1960

(Base of percentages is corrected population. Minus sign (-) indicates a net overcount)

Year and age (years)	Both sexes		Male		Female	
	White	Black	White	Black	White	Black
1970						
All ages.....	1.9	7.7	2.5	9.9	1.4	5.5
Under 5.....	2.1	10.1	2.3	10.4	2.0	9.8
5 to 9.....	2.3	7.3	2.4	7.7	2.2	6.9
10 to 14.....	1.0	3.2	1.1	3.5	0.9	2.8
15 to 19.....	0.9	3.7	1.3	4.3	0.5	3.2
20 to 24.....	1.8	8.5	2.5	12.1	1.1	5.2
25 to 34.....	3.4	12.5	4.3	18.5	2.4	6.7
35 to 44.....	2.0	10.7	3.6	17.7	0.5	4.0
45 to 54.....	1.4	8.7	2.7	12.4	0.1	5.3
55 to 64.....	1.1	8.0	2.2	9.2	1.9	7.0
65 and over.....	1.8	1.2	1.2	-3.1	2.2	4.2
1960						
All ages.....	2.0	8.0	2.4	9.7	1.6	6.3
Under 5.....	1.5	5.8	1.9	6.6	1.1	5.1
5 to 9.....	1.9	4.7	2.4	5.1	1.5	4.2
10 to 14.....	2.0	4.4	2.5	5.0	1.5	3.9
15 to 19.....	3.2	10.9	3.8	12.3	2.4	9.6
20 to 24.....	3.4	13.9	4.3	18.4	2.4	9.5
25 to 34.....	2.3	12.5	3.6	18.5	1.0	6.5
35 to 44.....	1.0	7.6	2.2	11.5	-0.2	3.8
45 to 54.....	2.5	9.9	2.5	11.0	2.4	9.0
55 to 64.....	1.1	10.1	0.5	8.5	1.7	11.6
65 and over.....	2.2	-1.0	0.0	-5.8	3.5	2.8

Source: U.S. Bureau of the Census, Census of Population and Housing: 1970, Evaluation and Research Program PHC(E)-4, Estimates of Coverage of Population by Sex, Race, and Age: Demographic Analysis, 1974, table 6, p. 31.

adult ages, with especially large undercounts for males in their 20's and 30's. Comparison of sex ratios for the various Hispanic populations in 1970 with those for Whites and Blacks further suggests that levels of undercoverage for the Hispanic populations are intermediate between those of the White and Black populations (see table 11).

SPECIFIC MEASURES OF NET ERRORS IN AGE-SEX DATA

The demographic techniques which have been used to derive specific measures of net errors in age-sex data from censuses include construction of an expected population from vital statistics and immigration data, comparative analysis of data from a series of previous censuses and reconstruction of the population for the date of the last census (e.g., the Coale-Zelnik and Coale-Rives methods),⁴⁵ intercensal cohort

analysis, and comparison with aggregate data from administrative records. Application of such techniques to the Hispanic population in 1970 is not possible or, at the least, is seriously handicapped by the lack of appropriate data, the limited comparability of the available data, and/or their restricted temporal and geographic scope. Some examples of attempts to estimate census coverage and reporting of specific age groups for the Hispanic population by demographic techniques, particularly intercensal cohort analysis, are presented in this part of the report.

Comparison with Expected Population

Construction of an expected population from vital statistics makes use of a form of the population component estimating equation

$$\hat{P}_a^{1970} = B^{1970-(a+1)} - D_a + M_a$$

That is, the expected population aged a in 1970 is equal to the births a to $a+1$ years earlier minus the deaths that have

⁴⁵ Ansley J. Coale and Melvin Zelnik, New Estimates of Fertility and Population in the United States, Princeton University Press, 1963.
Ansley J. Coale and Norfleet W. Rives, Jr., "Statistical Reconstruction of the Black Population of the United States, 1880-1970: Estimates of True Numbers by Age and Sex, Birth Rates, and Total Fertility," Population Index, January 1973.

occurred to the birth cohort between the date of birth and the census date plus net migration of this birth cohort.

As has been noted, practically none of these data exist for the Hispanic population for the entire country according to any of the identifiers. Only very limited data on Hispanic births exist—births to persons of Spanish surname for about five States, Puerto Rican births for one State (New York), and corresponding data for selected cities (e.g., Los Angeles, San Antonio, New York City)—and even these data do not go back very far in time.⁴⁶ For deaths, the situation is similar. Only a limited amount of data on the international and internal migration of the Hispanic population exists even though migration is an important contributor to the growth of the Hispanic population. Since adequate data of this kind are not available, the construction of an expected population and the estimation of coverage errors for the Hispanic population in 1970 by applying this particular demographic technique cannot be satisfactorily accomplished.

Intercensal Cohort Analysis: General Considerations

Intercensal cohort analysis uses the component estimating equation to follow a cohort from one census to another

$$\hat{P}_a^{1970} = P_{a-10}^{1960} - D_a^{1960-70} + M_a^{1960-70}, a \geq 10$$

Here the components $D_a^{1960-70}$ and $M_a^{1960-70}$ refer to the data for the intercensal period for the cohort age $a-10$ in 1960 and a in 1970. Comparison of the expected population in a given age group in 1970, \hat{P}_a^{1970} , with the census count for 1970 in the age group yields a measure of "bicensal relative error," i.e., a measure of the net error in the 1970 count relative to the net error in the 1960 census count for the same age cohort. This measure, calculated by dividing the difference between the census count and the expected population by the expected population, can be interpreted loosely as the number of percentage points by which the "coverage" of a cohort improved or worsened relative to its "coverage" in the previous census.⁴⁷

In order to derive a measure of absolute error in the 1970 census count by means of intercensal cohort analysis, it is necessary to correct the 1960 population count, P_{a-10}^{1960} , for net census error. Since definitive estimates of the coverage

of the 1960 census are not available for any of the Hispanic populations, the results of intercensal cohort analysis for these populations are limited to bicensal relative errors or illustrative calculations based on assumed levels of coverage for 1960. Furthermore, the limited data available on the mortality and migration of the Hispanic population for the 1960-70 intercensal period make any results subject to possibly serious errors.

The lack of historical comparability and the limited geographic scope of the data also preclude a meaningful application of intercensal cohort analysis on a national scale to the estimation of the coverage of the Hispanic population. Data are not available for the entire country according to any general Hispanic identifier for the last two censuses. As previously noted, only two of the Hispanic identifiers employed in 1970 were used in the previous census—Spanish surname (in five Southwestern States) and birth or parentage in a country of Spanish language (Cuba, Puerto Rico, Mexico, etc.). However, intercensal cohort analysis is not feasible for the Spanish-surname population. Counts of the Spanish-surname population in the 1960 and 1970 censuses were produced only for the five Southwestern States. This geographic restriction, combined with a lack of data on the migration of persons of Spanish surname to and from the five States, prevents any possibility of deriving adequate coverage estimates for this population. In fact, intercensal cohort analysis for the Spanish-surname population would probably produce better estimates of intercensal net migration than of coverage.

Intercensal cohort analysis can be meaningfully applied to certain populations of Hispanic birth or parentage for cohorts alive in 1960 (i.e., aged 10 years and over in 1970). At best, such an analysis can tell us only about the relative consistency of coverage and reporting in the two censuses for the restricted population groups involved. The estimates would be affected by any errors in the allowances for intercensal mortality and net migration. In applying intercensal cohort analysis when there is no need to allow for net migration or when satisfactory data on net migration are available, relatively more accurate estimates of coverage and reporting errors may be derived. Accordingly, illustrative estimates of the coverage of the population of Puerto Rican birth or parentage, the population of Cuban birth, and the native population of Mexican parentage will be presented. The specific circumstances that permit the preparation of these estimates are discussed in subsequent sections.

Intercensal Cohort Analysis: Population of Puerto Rican Birth or Parentage

Data on the population of Puerto Rican birth or parentage in the United States are available for each of the components in the intercensal estimating equation. Detailed tabulations for sex and age categories are available from both the 1960 and 1970 censuses for the population of Puerto Rican birth or parentage.⁴⁸ Life tables applicable to various time periods

⁴⁶ In 1978 about 18 States started to collect birth statistics identifying births of the Spanish-origin population. See the subsequent section, "Prospects for Measuring the Coverage of the Hispanic Population."

⁴⁷ Bicensal relative error algebraically represents the change in the amount of undercount between the two censuses divided by the excess of the 1970 true population (unknown) over the amount of undercount in 1960 (also unknown). As such, the bicensal relative error is an upper limit to the percentage point change in net census error for an age cohort under most conditions. Another similar interpretation of the bicensal relative error is that it represents the percent net "coverage" error in the second census on the assumption that the first census is a perfect count. If the amount of intercensal change exceeds the amount of undercount in the earlier census, as it will for most populations and for age cohorts subject to in-migration, then the bicensal relative error will be greater than the change in undercount rates.

⁴⁸ U.S. Bureau of the Census, *Census of Population: 1970, Subject Reports, PC(2)-1E, Puerto Ricans in the United States, 1973*, and U.S. Bureau of the Census, *Census of Population: 1960, Subject Reports, PC(2)-1D, Puerto Ricans in the United States, 1963*.

in the decade have been developed for the population of Puerto Rico and were assumed to apply to the United States population of Puerto Rican birth or parentage for measuring the mortality component of the population.⁴⁹ Estimates of net migration, usually the most elusive component, were developed from the monthly totals of passenger traffic entering and leaving Puerto Rico compiled by the Puerto Rico Planning Board. Estimates of the corresponding age-sex distribution of net migration are more problematical than other elements of the intercensal cohort analysis but can be derived from several small surveys conducted in Puerto Rico and from the 1960 and 1970 censuses of both the United States and Puerto Rico. Subsequent sections describe the specific procedures and assumptions employed to produce estimates of bicensal relative coverage of the population of Puerto Rican birth or parentage.

A basic step in deriving the expected population of Puerto Rican birth or parentage in 1970 is to calculate the survivors in 1970 of the population of Puerto Rican birth or parentage in the United States in 1960. To determine the size of this population for each age-sex group in 1970, 5-year (age-interval) life table survival rates from the Puerto Rican life tables for 1959-61 and 1967-69 were applied to the enumerated population of Puerto Rican birth or parentage in 1960. (See table 12.) The levels of life expectation at birth in the Puerto Rican life tables—67.1 years and 68.2 years for males in 1959-61 and 1967-69, and 71.9 years and 73.8 years for females in 1959-61 and 1967-69, respectively—are similar to the levels in the life tables for the Spanish-surname population of Texas and the Puerto Rican population of New York City. Thus, it was deemed appropriate to apply the Puerto Rican life tables to Puerto Ricans residing in the United States.

The migration component for the intercensal period was not derived in such a straightforward manner. The Puerto Rico Planning Board supplies the Bureau of the Census with monthly totals of arrivals and departures by air and water for Puerto Rico. These figures are adjusted slightly to remove seasonal fluctuations and the difference between them gives the net migration from Puerto Rico to the United States. However, information on the age and sex distribution of the migrants is not available from the same source. The age and sex distribution of migrants to Puerto Rico was derived from the Labor Force Survey conducted by the Puerto Rico Planning Board covering the years 1965 through 1967. The age and sex distribution of migrants from Puerto Rico to the United States came from the Health Survey (a subsample of the Labor Force Survey) for the years 1963 and 1965 through 1967. These two age-sex distributions were combined to give a distribution for "net migrants" which was assumed to apply to each year of the decade.

The annual net migration figures for the 1960-1970 decade from Puerto Rico to the United States were recompiled into age cohorts for the two periods April 1, 1960 to March 31, 1965 and April 1, 1965 to March 31, 1970. The

migrants for the first half of the decade were "survived" to April 1, 1970, the census date, by applying 2½-year survival rates from the 1959-61 Puerto Rican life tables and then 5-year survival rates from the 1967-69 Puerto Rican life tables. For migrants entering in 1965-70, 2½-year survival rates from the 1967-69 life tables were used. The resulting estimates of surviving migrants were added to survivors of the 1960 census population to derive the expected population in 1970. Comparison of this expected population with the 1970 census counts of the population of Puerto Rican birth or parentage then gives a measure of the improvement or deterioration in census coverage since 1960 for each cohort. The results are shown in table 12.

Intercensal cohort analysis indicates a slight improvement, 0.9 percent at most, in the coverage of the population of Puerto Rican birth or parentage between the 1960 and 1970 censuses. Although the estimate of coverage for the total population is plausible, many of the estimates for specific age and sex groups are clearly implausible and the possibility of errors in the estimation procedure is indicated. The coverage rates for each sex, a 6.2 percent decline in coverage for males and an 8.7 percent improvement for females, taken separately, are each within the realm of possibility. However, there is no good explanation why the coverage of one sex would improve so dramatically while the other is experiencing an almost equally dramatic decline.

The results in table 12 indicate that the coverage of the total cohort aged 20-29 in 1970 (10-19 in 1960) was 24 percent worse, and the male cohort 34 percent worse, in 1970. It is extremely unlikely that coverage decreased by such a tremendous percentage even for this age cohort, which usually has greater decreases in coverage than other age cohorts. (See table 11 for coverage rates in 1970 and 1960 for Whites and Blacks.) For females over age 30 and males over age 40 in 1970 coverage seems to have improved between 1960 and 1970. However, the magnitudes of the improvements, from 25 to 99 percent for males and 28 to 94 percent for females, are much too large to be plausible. Coverage of the population of Puerto Rican birth or parentage in the 1960 census could not have been so poor as to leave room for improvements of this magnitude.

The pattern of large relative overcounts in some age-sex groups and large relative undercounts in others, combined with a plausible coverage level for the total population, indicates the possibility of misallocation of one or more components by age and sex. The most likely source of this type of error is the age-sex distribution of the net migrants. Although the total number of migrants was determined from a complete count of traffic to and from Puerto Rico, the age and sex distribution of these migrants was determined from small sample surveys covering only a part of the decade. Consequently, for re-estimation of the coverage of Puerto Ricans, the total number of migrants for each half of the decade, approximately 46,000 from 1960 to 1965 and 112,000 from 1965 to 1970, was accepted as accurate, but the age-sex distribution of the migrants derived from the Puerto Rican sample surveys was rejected as unsatisfactory and an alternative source was investigated.

⁴⁹ Life tables for 1959-61, 1967-69, and 1969-71, for each sex, were supplied by the Division of Demographic Registry and Vital Statistics, Department of Health, Puerto Rico.

Table 12. Estimates of Bicensal Relative Error for the Population of Puerto Rican Birth or Parentage, Using Sample Survey Data for the Age-Sex Distribution of Migrants, by Sex: 1960-1970

(Populations in thousands. Percentages and totals computed from unrounded figures)

Age (years) and sex		Census population, 1960 ¹	Survivors of 1960 census, 1970 ²	Net move- ment from Puerto Rico, 1960-1970 ³	Survivors of net move- ment from Puerto Rico, 1970 ^{3,4}	Expected population, 1970 (2)+(4)= (5)	Census population, 1970 ¹	Percent relative error ⁵ [(6)-(5)] ÷ (5) = (7)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
In 1960								
In 1970								
TOTAL								
All ages.....10 and over.....		893.0	859.0	+141.3	+146.2	1,005.1	1,014.2	+0.9
Under 10.....10 to 19.....		255.1	252.4	+66.3	+66.0	318.5	308.2	-3.2
10 to 19.....20 to 29.....		165.9	164.2	+175.3	+174.2	338.5	257.8	-23.8
20 to 29.....30 to 39.....		180.5	176.9	-0.2	-0.1	176.8	194.9	+10.2
30 to 39.....40 to 49.....		143.3	138.3	-38.6	-37.6	100.6	128.2	+27.4
40 to 54.....50 to 64.....		100.5	93.1	-42.5	-40.3	52.8	91.4	+73.1
55 and over.....65 and over.....		47.6	33.9	-19.0	-16.0	17.9	33.8	+88.6
MALE								
All ages.....10 and over.....		446.9	427.7	+94.9	+97.4	525.1	492.6	-6.2
Under 10.....10 to 19.....		129.2	127.7	+32.7	+32.6	160.3	156.6	-2.3
10 to 19.....20 to 29.....		81.7	80.6	+108.0	+107.2	187.8	123.0	-34.5
20 to 29.....30 to 39.....		91.0	88.6	+9.4	+9.4	98.0	94.0	-4.1
30 to 39.....40 to 49.....		73.7	70.5	-21.2	-20.6	50.0	62.2	+24.6
40 to 54.....50 to 64.....		50.5	45.9	-25.8	-24.3	21.6	43.0	+99.2
55 and over.....65 and over.....		20.8	14.5	-8.3	-6.9	7.6	13.8	+81.7
FEMALE								
All ages.....10 and over.....		446.2	431.2	+46.4	+48.8	480.0	521.6	+8.7
Under 10.....10 to 19.....		125.9	124.8	+33.5	+33.5	158.2	151.6	-4.2
10 to 19.....20 to 29.....		84.3	83.7	+67.3	+67.0	150.7	134.8	-10.6
20 to 29.....30 to 39.....		89.5	88.3	-9.6	-9.5	78.8	100.8	+27.9
30 to 39.....40 to 49.....		69.7	67.8	-17.4	-17.1	50.7	66.0	+30.3
40 to 54.....50 to 64.....		50.0	47.3	-16.7	-16.0	31.2	48.4	+55.1
55 and over.....65 and over.....		26.8	19.4	-10.6	-9.1	10.3	20.0	+93.6

¹Males adjusted to include Armed Forces overseas.

²Derived with 1959-61 and 1967-69 life tables for Puerto Rico (by sex).

³A plus sign denotes net movement into the United States; a minus sign denotes net movement into Puerto Rico.

⁴Derived from 1960-65 and 1965-70 migration figures and 1959-61 and 1967-69 life tables for Puerto Rico (by sex).

⁵A plus sign denotes a relative net overcount in the 1970 census as compared with the 1960 census; a minus sign denotes a relative net undercount.

Base of percent is expected population.

Sources: See text.

Basic sources of information on migration between Puerto Rico and the United States are the replies to the questions on place of birth and residence 5 years ago in the 1960 and 1970 censuses of the United States and Puerto Rico. Data on residence in Puerto Rico in 1965 from the 1970 census for age-sex groups 15 years and over of the population of Puerto Rican birth and parentage were adjusted to include a proportion of persons who had moved but did not report their residence.⁵⁰ These data, given only in broad age groups, were subdivided into 5-year groups on the basis of the distribution of the corresponding age-sex groups for the population of Puerto Rican birth or parentage residing in New York, New Jersey, and Pennsylvania. To estimate migrants from Puerto Rico from 1965 to 1970 at ages under 15, the proportion of each Puerto Rican birth cohort migrating to the United States in a 5-year period was first calculated by combining the population residing in the United States but born in Puerto Rico with the population residing and born in Puerto Rico, as shown by the 1960 and 1970 censuses. Successive differences in lifetime proportions migrating for age cohorts in the two censuses then gave an estimate of the proportion of the birth cohort migrating

to the United States from 1965 to 1970. The result of applying these procedures was a complete age-sex distribution of migrants from Puerto Rico to the United States during the 1965-70 period.

The procedure for estimating migration from the United States to Puerto Rico was similar. Data for 5-year age-sex groups over age 15 on residence in the United States in 1965 from the 1970 census for Puerto Rico were adjusted *pro rata* to include a proportion of those who had moved but failed to report their residence in 1965.⁵¹ For ages under 15, the calculation paralleled that for migrants from Puerto Rico except that the cohorts born in the United States consisted of the sum of persons of Puerto Rican parentage residing in the United States in 1970 and persons born in the United States and residing in Puerto Rico in 1970. These procedures yielded a complete age-sex distribution of persons migrating from the United States to Puerto Rico during the 1965-70 period.

The differences between the age-sex distribution of migrants from Puerto Rico and the age-sex distribution of migrants to Puerto Rico from 1965 to 1970 yielded a distribution by age and sex for net migration to the United

⁵⁰ U.S. Bureau of the Census, Census of Population: 1970, Subject Reports, PC(2)-1E, Puerto Ricans in the United States, 1973, table 5, p. 39.

⁵¹ U.S. Bureau of the Census, Census of Population: 1970, Volume 1, Characteristics of the Population, Part 53, Puerto Rico, PC(1)-53, 1973, table 113, p. 53-623.

States from Puerto Rico. This age-sex distribution was then assumed to apply both to net migrants for the 1965-70 period in cohorts aged 5 years and over in 1970 and for the 1960-65 period in cohorts aged 10 years and over in 1970. The distribution was adjusted by the plus-minus proportionate adjustment method⁵² for each 5-year period to the previously established totals derived from the Puerto Rico Planning Board data. The net migrants in each 5-year period were then "survived" to 1970 by use of the same life tables as in the previous estimate and then added to survivors of the 1960 census counts, to yield the estimates of the expected population of Puerto Rican birth or parentage shown in table 13.⁵³

The coverage estimates for the population of Puerto Rican birth or parentage in the 1970 census relative to the 1960 census which result from use of the revised migration estimates are clearly much more plausible than those originally derived. These estimates indicate an improvement in coverage of 4.9 percent for the total population 10 years and over in 1970 (3.9 percent for males and 5.8 percent for females).

⁵² The Methods and Materials of Demography, op. cit., pp. 705-6.

⁵³ Discrepancies in the migration totals shown in tables 12 and 13 are the result of differences in the number of migrants allocated to the cohorts born between 1960 and 1970.

The largest improvements are for the male and female cohorts aged 30-39 in 1970 (20-29 in 1960), 16 percent for males and 22 percent for females. The ages 20-29 are usually among the most poorly covered (table 11), so that this amount of improvement is consistent with an overall improvement in coverage and the improvement attributable to the aging of the cohort. Other large improvements in coverage occurred for the male cohorts aged 65 and over in 1970 and female cohorts aged 50 and over in 1970. These large coverage increases relative to the 1960 census are consistent with the inferences drawn from the analysis of census survival ratios regarding the existence of possibly large coverage errors in 1960 in these cohorts. Relative coverage errors in the other cohorts are generally small and appear plausible.

Again, it must be stressed that the coverage estimates for the population of Puerto Rican birth or parentage shown in table 13 represent bicensal relative errors, i.e., changes in levels of census coverage between 1960 and 1970. In order to derive measures of the absolute level of census coverage in 1970 for the population of Puerto Rican birth or parentage using intercensal cohort analysis, estimates of coverage in the 1960 census are required. Since such estimates are not available, definitive estimates of coverage for the population of Puerto Rican birth or parentage in 1970 cannot be developed.

Table 13. Estimates of Bicensal Relative Error for the Population of Puerto Rican Birth or Parentage, Using Census Data on Migration, by Sex: 1960-1970

(Populations in thousands. Percentages and totals computed from unrounded figures)

Age (years) and sex		Census population, 1960 ¹	Survivors of 1960 census, 1970 ²	Adjusted net migration from Puerto Rico, 1960 to 1970 ^{3,4}	Surviving net migrants from Puerto Rico, 1970 ^{4,5}	Expected population, 1970 ¹	Census population, 1970 ¹	Percent relative error ⁶ [(6)-(5)]/(5)= 17
		(1)	(2)	(3)	(4)	(5)	(6)	
In 1960								
In 1970								
TOTAL								
All ages.....	10 and over.....	893.0	859.0	+107.7	+108.3	967.3	1,014.2	4.9
Under 10.....	10 to 19.....	255.1	252.4	+58.8	+58.6	311.1	308.2	-0.9
10 to 19.....	20 to 29.....	165.9	164.2	+85.7	+85.3	249.6	257.8	+3.3
20 to 29.....	30 to 39.....	180.5	176.9	-13.1	-13.0	164.0	194.9	+18.8
30 to 39.....	40 to 49.....	143.3	138.3	-11.6	-11.3	126.9	128.2	+1.0
40 to 54.....	50 to 64.....	100.5	93.1	-7.6	-7.3	85.8	91.4	+6.5
55 and over.....	65 and over.....	47.6	33.9	-4.6	-4.1	29.9	33.8	+13.1
MALE								
All ages.....	10 and over.....	446.9	427.7	+46.3	+46.5	474.2	492.6	3.9
Under 10.....	10 to 19.....	129.2	127.7	+27.7	+27.5	155.2	156.6	+0.9
10 to 19.....	20 to 29.....	81.7	80.6	+39.1	+38.8	119.4	123.0	+3.0
20 to 29.....	30 to 39.....	91.0	88.6	-7.3	-7.3	81.4	94.0	+15.5
30 to 39.....	40 to 49.....	73.7	70.5	-7.1	-7.0	63.5	62.2	-2.1
40 to 54.....	50 to 64.....	50.5	45.9	-4.2	-4.0	41.9	43.0	+2.6
55 and over.....	65 and over.....	20.8	14.5	-1.8	-1.7	12.8	13.8	+7.4
FEMALE								
All ages.....	10 and over.....	446.2	431.2	+61.5	+61.8	493.1	521.6	+5.8
Under 10.....	10 to 19.....	125.9	124.8	+31.2	+31.1	155.9	151.6	-2.8
10 to 19.....	20 to 29.....	84.3	83.7	+46.7	+46.5	130.2	134.8	+3.5
20 to 29.....	30 to 39.....	89.5	88.3	-5.7	-5.7	82.6	100.8	+22.1
30 to 39.....	40 to 49.....	69.7	67.8	-4.4	-4.4	63.4	66.0	+4.2
40 to 54.....	50 to 64.....	50.0	47.3	-3.4	-3.3	44.0	48.4	+10.1
55 and over.....	65 and over.....	26.8	19.4	-2.8	-2.4	17.0	20.0	+17.3

¹ Males adjusted to include Armed Forces overseas.

² Derived with 1959-61 and 1967-69 life tables for Puerto Rico.

³ Age distribution of net migrants to Puerto Rico, 1965-70, as estimated from 1970 census adjusted to total net migration from Puerto Rican passenger traffic for 1960-65 and 1965-70.

⁴ A plus sign denotes net movement into the United States; a minus sign denotes net movement into Puerto Rico.

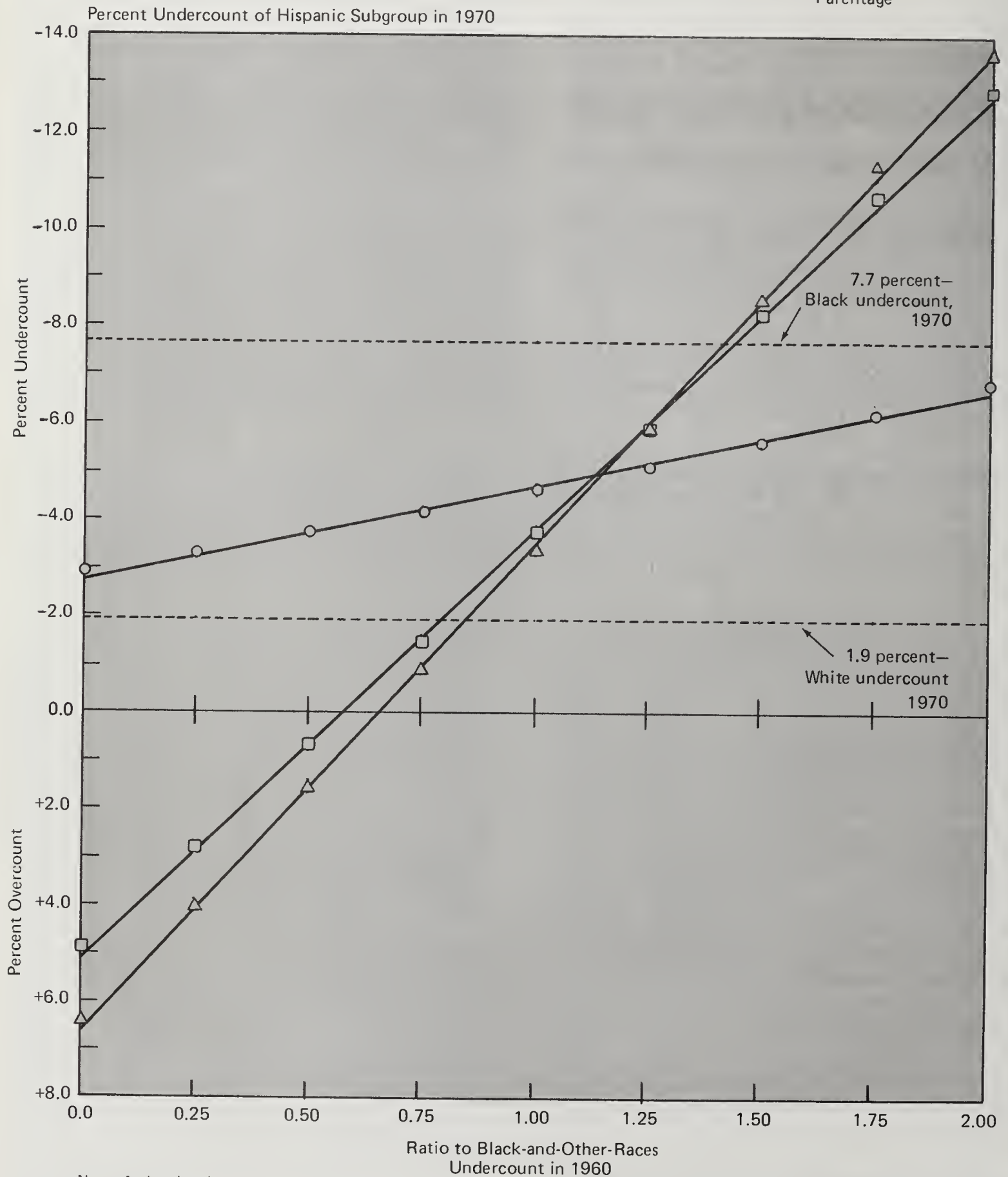
⁵ Derived from 1960-65 and 1965-70 net migration figures and 1959-61 and 1967-69 Puerto Rican life tables (by sex).

⁶ A plus sign denotes a relative net overcount in the 1970 census as compared with the 1960 census; a minus sign denotes a relative net undercount. Base of percent is expected population.

FIGURE 4.

Percent Net Undercount in 1970 for Various Subgroups of the Hispanic Population as a Function of the Assumed Ratio of Undercount Rates for the Subgroup in 1960 to Undercount Rates for the Black-and-Other-Races Population in 1960

- Foreign-born Cubans
- Puerto Rican Birth or Parentage
- △ Native of Mexican Parentage



Illustrative estimates of census coverage for the population of Puerto Rican birth or parentage in 1970 can be developed, however, by correcting the 1960 census counts for this population with an assumed set of coverage rates. For this purpose it was arbitrarily assumed that the coverage rates for the population of Puerto Rican birth or parentage in 1960 were the same (for age and sex categories) as those for the Black-and-other-races population in 1960.⁵⁴ With this assumption (which implies an overall undercount of 9.0 percent in 1960), the undercount of the population of Puerto Rican birth or parentage in 1970 would be 3.7 percent. This analysis can be carried further to determine the sensitivity of the 1970 undercount rates to various assumptions regarding the 1960 undercount rates. Figure 4 shows the 1970 undercount rates for the population of Puerto Rican birth or parentage which would result if various multiples of the 1960 undercount rates (for age and sex categories) for the Black-and-other-races population are assumed to apply to the 1960 population of Puerto Rican birth or parentage. An undercount greater than 0.78 times that of Blacks-and-other-races in 1960, or 7.1 percent, would result in a greater undercount of the population of Puerto Rican birth or parentage in 1970 than that of Whites in 1970 (1.9 percent). An undercount of less than 1.42 times that of Blacks-and-other-races in 1960, 12.9 percent, would yield an

undercount in 1970 of less than the 7.7 percent undercount of Blacks. Thus, for a fairly wide range of assumed undercount rates in 1960, the undercount rate for the population of Puerto Rican birth or parentage in 1970 would be intermediate between the rates for Whites and Blacks in 1970.

Intercensal Cohort Analysis: Foreign-born Cuban Population

The availability of 1960 census data on the population of Cuban birth and Immigration and Naturalization Service (INS) data on immigration into the United States from Cuba between 1960 and 1970 suggests the possibility of calculating some rough estimates of net census errors for the population of Cuban birth in 1970. This group accounted for over 80 percent of the population of Cuban origin in the United States in 1970, so that the estimates can be thought of as applying approximately to the entire Cuban population of the United States. Furthermore, because of the large volume of immigration from Cuba during the 1960's, only about one-sixth of the 1970 population of Cuban birth lived in the United States in 1960. Because most of the estimated population is based on data on immigration during the decade, the component of the bicensal relative coverage error arising from error in the 1960 census data is small.

To estimate the expected population of foreign-born Cubans in 1970, we first estimate the segment that is the survivors of the foreign-born Cubans enumerated in 1960. The 1960 census provides only the total number of foreign-

Table 14. Immigrants of Cuban Birth, by Type of Admission, for Each Year, 1959-60 to 1969-70

Year (Ending June 30 of year shown)	Immigrants admitted ¹ (1)	Parolees (refugees) admitted (2)	Parolees adjusting status (3)	Total entrants (4)
Total, 1960-70...	265,052	310,517	² 140,582	³ 439,746
1960.....	8,283	(X)	(X)	8,283
1961.....	14,287	3,900	(X)	18,187
1962.....	16,254	58,630	(X)	74,884
1963.....	10,587	34,537	(X)	45,124
1964.....	15,808	5,390	(X)	21,198
1965.....	19,760	2,322	(X)	22,082
1966.....	17,355	32,542	(X)	49,897
1967.....	33,321	44,963	25,752	52,532
1968.....	99,312	45,136	91,520	52,928
1969.....	13,751	41,751	6,343	49,159
1970.....	16,334	41,346	12,208	45,472

X Not applicable.

¹Includes parolees adjusting status after 1967.

²Cumulative total through June 30, 1970 as published in 1970 Annual Report of the Immigration and Naturalization Service, page 9. Annual figures shown add to 135,823.

³Sum of annual figures shown.

Sources: Columns (1)-(3)--United States Immigration and Naturalization Service, Annual Report, 1960 through 1970, especially table 9.

Column (4)--See text for description of derivation procedure.

born Cubans of each sex without any age detail. To determine the survivors of this group for each sex in 1970, the 1960 census totals for males and females were distributed by age according to the age distribution of persons born in Puerto Rico shown by the 1960 census and then "aged" to 1970 with survival rates from the 1959-61 life table for the White population of Florida.⁵⁵ The resulting totals of 37,400 males and 37,900 females were then redistributed by age according to the 1970 census age distribution of foreign-born Cubans who entered the United States prior to 1960. The effect of errors in the assumptions underlying these calculations would be small because, as noted earlier, most foreign-born Cubans in the United States in 1970 entered after 1960. However, the likely effect of the procedure is to increase very slightly the level of the estimated net undercounts. Cuban immigrants tend to be older than Puerto Rican immigrants so that, if the true age distribution in 1960 were known, fewer survivors in 1970 would have been estimated from the 1960 population.

The remaining foreign-born Cubans in the United States in 1970 represent survivors of three categories of Cuban arrivals between 1960 and 1970: immigrants with permanent status, parolees (refugees) with nonpermanent status, and parolees who had been in the United States for a minimum of 2 years and whose nonpermanent status was subsequently adjusted to permanent status under the 1966 Cuban Refugee Act. (See table 14 for data on immigrants.) Data for each group had to be treated differently to arrive at age distributions for them because of the different amount of information available for each group. INS Annual Reports provide age distributions in 10-year groups for each sex for immigrants with permanent status; these data were then subdivided into 5-year groups by polynomial (cubic) interpolation. For parolees (refugees), or immigrants with nonpermanent status, the INS reports provide only total annual figures for 1961 to 1970. Parolees who entered between 1960 and 1966 were assumed to have the same age and sex distribution as immigrants with permanent status who entered during the same year. Parolees who entered between 1967 and 1970 were distributed by age and sex according to the age-sex distribution of parolees who had registered with Cuban refugee centers in Florida in the late 1960's.

The remaining group of foreign-born Cubans, parolees who have been accepted for permanent residence, are included in the age and sex data on permanent immigrants for the years 1967 through 1970 tabulated by the Immigration and Naturalization Service. Only the total number of persons whose status was adjusted, according to year of arrival, is available. Since these refugees have been included in the age and sex data for permanent migrants in the year of adjustment of status and since they should be added in the year of arrival, they must be excluded from the INS age-sex data to avoid double counting. The parolees whose status was adjusted were assumed to have the same age and sex distribution in each year as the permanent Cuban immigrants. The

number of Cuban immigrants for each age-sex group in each year between 1960 and 1970 was finally arrived at by adding the estimates for parolees with nonpermanent status for age-sex groups to the statistics for immigrants with permanent status and subtracting the estimates of parolees whose status was adjusted.

The expected number of survivors in 1970 of Cuban immigrants arriving between 1960 and 1970 was approximated by applying life table survival rates to the annual data on immigrants. The life tables used were those for the Spanish-surname population of Texas in 1970 previously described.⁵⁶ The survivors in 1970 were then recombined into conventional 5-year age groups. Some Cubans (immigrants and parolees) enter the greater United States through Puerto Rico and a small number of these remain in Puerto Rico. The latter persons must be excluded from the foreign-born Cuban population in the United States in 1970. The number of foreign-born Cubans who remained in Puerto Rico was assumed to be the number of aliens registering with the Immigration and Naturalization Service in 1970 (20,665).⁵⁷ Since no other information is available on these persons, it was arbitrarily assumed that one-quarter of them entered the greater United States during the 1960-65 period and the remainder entered during the 1965-70 period. These persons were then assigned to age and sex groups in proportion to all Cuban immigrants arriving during the appropriate time period. The expected foreign-born Cuban population then consisted of the survivors of foreign-born Cubans enumerated in 1960 plus the survivors of Cuban immigrants arriving between 1960 and 1970 less the number of aliens from Cuba registering with the Immigration and Naturalization Service in 1970 in Puerto Rico (table 15). It was assumed that there was no emigration of foreign-born Cubans.

Comparison of the expected number of foreign-born Cubans with the census figures appears to imply an estimated net undercount of about 3 percent for both sexes, about 4 percent for males, and about 3 percent for females. These figures must be treated as rough approximations at best. Moreover, because of the many broad assumptions employed in estimating the expected age and sex distributions, the estimates of net undercounts according to age, sex, and period of immigration cannot be treated as even approximate indications of the extent of error for these categories.

Several anomalous results in this set of estimates of the coverage of Cubans in the 1970 census point to specific

⁵⁶ The life tables for the Spanish-surname population of Texas in 1970 were the only recent life tables available representing the experience of a Hispanic population in the United States. Since most of the Cuban immigrants are young or middle-aged adults and since survival rates for these age groups are high, the results are practically insensitive to any reasonable choice of survival rates. Expectation of life at birth for alternative choices of life tables are:

	Male	Female
Texas, Spanish-surname, 1970-71.	68.1	73.4
Florida, White, 1959-61	67.9	75.7
Florida, White, 1969-71	68.2	76.4
Puerto Rico, 1959-61.	67.1	71.9
Puerto Rico, 1969-71.	69.0	75.2

⁵⁵ The majority of Cubans in the United States in 1960 were white and lived in Florida. Many were probably long-time residents of the United States. See the next footnote also.

⁵⁷ U.S. Immigration and Naturalization Service, 1970 Annual Report, Table 35, p. 105. The assumed figure includes 81 aliens of Cuban origin registering in the Virgin Islands.

Table 15. Illustrative Estimates of the Percents of Net Census Error for the Population of Cuban Birth, by Sex and Age and by Sex and Year of Entry into the United States: 1970

(Population in thousands. Base of percent is expected population. A plus sign denotes a net overcount in the census; a minus sign denotes a net undercount. Numbers rounded independently. Percentages computed from unrounded figures)

Age and year of immigration	Total			Male			Female		
	Census	Expected	Percent net error	Census	Expected	Percent net error	Census	Expected	Percent net error
AGE									
All ages, total.....	446.0	459.4	-2.9	208.7	218.4	-4.4	237.3	241.1	-1.6
Less than 15 years.....	76.4	74.9	+2.0	38.6	38.5	+0.3	37.8	36.4	+3.7
15 to 34 years.....	135.8	135.3	+0.4	62.2	64.3	-3.3	73.6	71.0	+3.7
35 to 54 years.....	157.7	173.7	-9.3	76.1	83.3	-8.6	81.5	90.4	-9.8
55 to 64 years.....	43.8	44.5	-1.6	19.0	19.7	-3.8	24.8	24.8	+0.2
65 years and over.....	32.3	30.9	+4.3	12.7	12.5	+1.9	19.5	18.4	+6.0
YEAR OF IMMIGRATION									
Prior to 1960.....	74.1	75.3	-1.6	35.9	37.4	-4.2	38.2	37.9	+0.9
1960 to 1964.....	167.9	161.8	+3.8	81.7	83.1	-1.7	86.2	78.7	+9.5
1965 to 1970.....	204.0	222.3	-8.2	91.1	97.8	-6.9	112.9	124.4	-9.3

Source of census figures: U.S. Bureau of the Census, Census of Population: 1970, Subject Reports, PC(2)-1A, National Origin and Language, 1973, table 17, p. 462. Census figures have been adjusted pro rata by age for year of entry not reported.

types of errors in the adjustment procedures. According to the estimates, children under 15 years of age were overcounted. In the light of our experience that pre-teenage children are usually undercounted, often substantially, the results suggest that too few parolees were allocated to this age group or too many "adjusted" parolees were removed from it.⁵⁸ A further difficulty with the estimation procedure is apparent in the much larger undercounts for ages 35 to 54 than for ages 15 to 34; from our experience with other populations, we would expect the relative levels of coverage for these two groups to be reversed or at least more similar. Again, this result suggests that too few parolees were assigned to the younger adult ages (for the 1960-66 period, especially) at the expense of the middle age groups or, alternatively, too many parolees were assigned to the younger age group for the 1967-70 period.

Irregularities in the estimates for the various periods of arrival suggest further difficulties with the estimation procedure. The estimated undercounts "in 1970" for foreign-born Cubans who arrived prior to 1960 represent bicensal relative net undercounts. Thus, the apparent slight overcount for females of about 1 percent for this group implies an improvement in coverage for the group. For the group arriving in the 1960-65 period, the estimates are clearly implausible. The 10-percent overcount for females coupled with a 2-percent undercount for males for this period suggests some possible misallocation by sex and/or by time period in estimating the expected population. This interpretation is presumably supported by the large apparent undercount for each sex in the 1965-70 period, in spite of the arbitrary assignment of most Cubans residing in Puerto Rico to this period and their exclusion from the expected number. Some

of the immigrants assigned to the 1965-70 period should presumably have been assigned to the earlier period.

The estimates of census coverage in 1970 for foreign-born Cubans shown in table 15 can be improved by correcting the 1960 census counts for coverage errors. However, since coverage estimates for this population are not available for 1960, it was arbitrarily assumed for illustrative purposes that the 1960 undercount rates (for age and sex categories) for the Black-and-other-races population also applied to the foreign-born Cuban population. With this assumption (implying an undercount of 9.7 percent in 1960), the resulting estimated overall undercount rate of foreign-born Cubans in 1970 would be about 4.6 percent, or 6.7 percent for males and 2.7 percent for females. Unlike the population of Puerto Rican birth or parentage, the estimated undercount for foreign-born Cubans in 1970 is not very sensitive to the assumed coverage rates in 1960. If the 1960 rates are assumed to be twice those for Blacks-and-other races (or 20.3 percent), the estimated overall undercount rate in 1970 for foreign-born Cubans would increase to only 6.8 percent (figure 4). This lack of sensitivity to the assumed 1960 coverage rates can be attributed to the fact that about five-sixths of the foreign-born Cuban population in 1970 entered the United States after 1960.

It is useful to stress a few points about these calculations. The reliability of coverage estimates depends strongly on the reliability of the data and assumptions on which the estimates are based. Since the estimates of coverage for foreign-born Cubans in the 1970 census derived by analytic techniques are based largely on rather inadequate data and untested assumptions, they are only rough estimates at best. Consequently, the estimates, particularly those for age-sex categories, should be used with extreme caution. This exercise may be viewed as illustrative of some of the problems in estimating census coverage from deficient and limited data.

⁵⁸ More detailed calculations show that most of the shortage in the expected population is in the age group 5-9 and that there is a slight excess in ages 0-4.

Intercensal Cohort Analysis: Native Population of Mexican Parentage

Data on the native population of Mexican parentage from both the 1960 and 1970 censuses can be employed to prepare estimates of bicensal relative coverage error for this group by means of intercensal cohort analysis. If the 1960 census counts are not corrected for underenumeration and if the survivors in 1970 of the 1960 population account for all of the expected 1970 population (that is, if the expected population relates only to ages 10 and over in 1970), the differences between the expected and census populations in 1970 represent the differences between the errors in the 1970 counts and the errors in the 1960 counts for the cohorts already born by 1960 (that is, the bicensal relative error) rather than net undercounts in 1970 as such.

Problems in dealing with immigration, such as those encountered in the analysis of data on Cubans and Puerto Ricans, are avoided, or at least reduced, by restricting the analysis to natives. Since the net movement of natives into or out of the country between 1960 and 1970 was probably quite small, the net migration component was ignored in the present calculations. Mainly for this reason, intercensal cohort analysis is much simpler for natives of Mexican parentage than for the foreign-born Cuban population or the population of Puerto Rican birth or parentage.

The 1960 census counts of natives of Mexican parentage were published only in broad age groups for each sex. They were first subdivided into 5-year age groups on the basis of the age distribution of the White Spanish-surname population

of Mexican parentage residing in the five Southwestern States in 1960. The expected population in 1970 was then derived by applying 10-year (time interval) survival rates from the life table for the Spanish-surname population of Texas in 1970 to the 1960 census population. Finally, the expected population in 1970 was compared with the 1970 census counts. As previously stated, no allowance was made for civilian immigration or emigration during the decade. Both the 1960 and 1970 populations were adjusted to include male members of the Armed Forces overseas.

One possible inference to be drawn from the intercensal cohort analysis for the native population of Mexican parentage is that coverage of this group improved between the two censuses by about 6 percent for each sex (table 16). Much of this apparent improvement in coverage occurred in only a few cohorts. Coverage of the cohorts aged 10-19 and over 70 in 1970 (aged 0-9 and over 60 in 1960) appears to have improved by over 20 percent between 1960 and 1970. These apparent coverage gains are so large that they cast doubt on the validity of the basic data. One likely source of error in the figures is misreporting of nativity by respondents for themselves and members of their households; e.g., in 1970, some persons born in Mexico who entered the country illegally may have reported a place of birth in the United States in order to legitimate their illegal presence in the United States or to bolster claims to American citizenship. Other potential sources of error are possible bias on the part of the Census Bureau in allocating nativity for persons who did not report place of birth and the omission of an allowance for net migration during the 1960-70 decade.

Table 16. Estimates of Bicensal Relative Error for the Native Population of Mexican Parentage, by Sex: 1960-1970

(Population in thousands)								
Age (years)	Male				Female			
	Census ¹ , 1960	Expected population, ² 1970	Census ¹ , 1960	Percent relative error ³ [(3)-(2)]÷(2)=	Census ¹ , 1960	Expected population, ² 1970	Census ¹ , 1970	Percent relative error ³ [(7)-(6)]÷(6)=
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
In 1960								
In 1970								
All ages..... 10 and over.....	582.9	558.0	593.1	+6.3	581.3	564.9	601.9	+6.5
0 to 4..... 10 to 14.....	72.4	71.8	88.6	+23.5	69.5	69.0	86.1	+24.8
5 to 9..... 15 to 19.....	64.8	64.4	76.2	+18.3	63.8	63.5	75.2	+18.4
10 to 14..... 20 to 24.....	64.3	63.6	62.3	-2.0	62.4	62.0	62.0	-0.1
15 to 19..... 25 to 29.....	58.1	57.2	54.1	-5.3	58.9	58.4	55.5	-5.0
20 to 24..... 30 to 34.....	53.4	52.2	57.9	+11.0	53.5	52.9	58.6	+10.7
25 to 29..... 35 to 39.....	61.3	59.5	62.8	+5.5	61.7	60.9	65.4	+7.5
30 to 34..... 40 to 44.....	68.4	66.0	66.6	+0.8	70.4	69.0	68.2	-1.1
35 to 39..... 45 to 49.....	51.4	49.2	50.2	+1.9	54.2	52.7	52.0	-1.4
40 to 44..... 50 to 54.....	31.7	29.8	28.5	-4.4	32.5	31.2	30.9	-1.0
45 to 49..... 55 to 59.....	20.9	18.9	18.5	-1.9	20.1	18.8	19.1	+1.4
50 to 54..... 60 to 64.....	13.2	11.2	11.3	+0.6	12.6	11.4	11.3	-0.9
55 to 59..... 65 to 69.....	9.0	7.1	7.6	+6.5	8.7	7.5	7.3	-1.8
60 to 64..... 70 to 74.....	5.1	3.6	4.2	+17.4	4.9	3.8	4.7	+25.1
65 and over..... 75 and over.....	8.8	3.6	4.4	+23.1	8.3	3.9	5.6	+46.4

¹Adjusted to include Armed Forces overseas.

²Derived by applying life table survival rates for 1970 Spanish-surname population of Texas to 1960 census counts.

³Percentages computed from unrounded figures. Base of percent is expected population. A plus sign denotes a relative net overcount in the 1970 census as compared with the 1960 census; a minus sign denotes a relative net undercount.

Source of census figures: U.S. Bureau of the Census, Census of Population: 1970, Subject Reports, PC(2)-1A, National Origin and Language, 1973, table 10, p. 70. U.S. Bureau of the Census, Census of Population: 1960, Subject Reports, PC(2)-1A, Nativity and Parentage, 1963, table 9, p. 32.

The patterns of the relative coverage errors for the cohorts aged 20 to 69 in 1970 (10 to 59 in 1960) are indicative of certain types of coverage problems in the censuses even though the magnitude of the absolute coverage errors in 1970 cannot be ascertained. The relative overcount of males at ages 65–69 in 1970 suggests possible age misstatement in 1970 on the part of individuals who had not actually turned 65. The relative undercounts at ages 20 to 29 for both sexes, coupled with large relative overcounts at ages 30 to 39, suggest that the cohorts aged 20 to 29 in 1970 (as well as the cohorts aged 20 to 29 in 1960) had worse coverage than the adjacent age groups. For the remaining cohorts (males aged 40 to 64 in 1970, except 50 to 54; females aged 40 to 69) the relative coverage errors are quite small, possibly smaller than the sampling error of the census data; this pattern indicates stability in census coverage over time.

As previously noted, to derive absolute measures of coverage error for the native population of Mexican parentage by intercensal cohort analysis, it is necessary to correct the 1960 census counts for coverage errors. No direct measures of census coverage in 1960 are available for this population so that it is not possible to produce definitive coverage estimates for it in 1970. However, illustrative estimates of coverage error in 1970 can be derived by assuming the level of coverage errors for 1960. If it is assumed, for example, that coverage rates by age and sex for the native population of Mexican parentage in 1960 were the same as the rates for Black-and-other-races population in 1960 (implying an overall undercount rate of 9.2 percent), then the overall net underenumeration for natives of Mexican parentage in 1970 (aged 10 years and over) would be 3.4 percent.

The sensitivity of this result to varying assumptions for 1960 can be tested by assuming that various multiples of the Black-and-other-races coverage rates in 1960 apply to the 1960 native population of Mexican parentage. According to figure 4, the 1970 undercount rate for natives of Mexican parentage would exceed that for Whites (1.9 percent) if the 1960 undercount rates were greater than 0.84 times those of the Black-and-other-races population in 1960, or 7.7 percent overall. On the other hand, if the 1960 undercount rates for natives of Mexican parentage were less than 1.41 times those of the Black-and-other-races population, or 12.9 percent overall, then the undercount rate for natives of Mexican parentage in 1970 would be less than 7.7 percent, the undercount rate for Blacks in 1970. Thus, for a fairly wide range of assumed coverage rates in 1960, the undercount for natives of Mexican parentage falls between that for Whites and that for Blacks.

These illustrative estimates are subject to the several types of errors discussed earlier as well as the possibility that the pattern and level of coverage rates in 1960 for natives of Mexican parentage differed considerably from those of the Black-and-other-races population. Perhaps the only definitive statement that can be made on the basis of this analysis is that the coverage of natives of Mexican parentage probably improved by about 6 percent between 1960 and 1970.

Stable Population Models

Stable population models have been widely used in the evaluation of census data. Stable population models are theoretical, unchanging age distributions which result from and correspond to specific rates of population growth and specific schedules of fertility and mortality. Given the rate of growth of a population and its mortality level, for example, it is possible to specify its age distribution under certain conditions. The stable population model assumes unchanging fertility and mortality and the absence of net immigration over a long period. Under these circumstances the stable age distribution corresponding to the observed growth rate and the observed fertility and mortality rates may be taken to represent the true age distribution for purposes of evaluating the enumerated age distribution. The Hispanic population does not conform to this model, however, viewed from any aspect, now or in the past. Another type of population model, the quasi-stable model, assumes constant fertility, slowly declining mortality, and the absence of net immigration; this model also does not fit the case of the Hispanic population.

These model age distributions essentially correct for errors of age reporting; they correct for coverage errors to only a minimal extent. This inference follows from the fact that stable population analysis does not in itself provide for an alternative total for a population, only for an alternative age distribution. Coverage estimates made for specific age-sex groups, using these or similar models, are likely to be very much in error.

Comparison With Aggregate Administrative Record Data

Another possibility for obtaining coverage estimates for the Hispanic population involves comparing counts from a set or sets of administrative records according to one of the identifiers with counts from the census. The records must be complete or must be adjusted for incomplete coverage, and the Hispanic identifier must be the same for the administrative records as for the census. A further requirement is that the records be national in scope or, if restricted to a particular geographic area, contain valid addresses as of the census day. We have not been able to identify any such sets of administrative records for use in estimating the coverage of the Hispanic population in the 1970 census.

The Hispanic identifier which could prove to be most useful for exploiting administrative records is Spanish surname. It is a quite objective criterion, compared with Spanish origin and similar subjective criteria. Furthermore, the use of Spanish surname does not require that persons identify themselves as Hispanic upon entry into the record system; that is, it is not necessary for the agency which created the record system to have included identification of individuals as Hispanic in its original objectives. The major drawback of the Spanish-surname identifier is that the list of names, as now constituted, has not proven successful in identifying the Hispanic population outside the five Southwestern States.⁵⁹

⁵⁹ U.S. Bureau of the Census, Technical Paper No. 38, *op. cit.*

Research is now in progress which could result in the development of a list of Spanish surnames for use in identifying Hispanic persons in administrative record files and in the census for the entire country. (See section, "Plans for Evaluation Studies in 1980".)

The Social Security Administration/Internal Revenue Service files could prove to be quite useful for estimating the coverage of the Hispanic population even though, at present, neither the application form for a Social Security number nor the other record forms of the SSA or the IRS contain explicit information identifying Hispanic persons. One approach to the problem would involve matching a sample of persons with Spanish surnames in the SSA/IRS files to the census for 1970. However, this procedure is costly and complex and is not now practicable for 1970.

CONCLUSION

Development of definitive estimates of coverage of the Hispanic population in the 1970 census has not proved to be feasible at this time, on the basis of any of the techniques discussed in the preceding sections. However, some very general indications of coverage levels and patterns have been identified. The general measures of errors in the age and sex data of the Hispanic population suggest that the coverage level of the Hispanic population in 1970 falls between that of the White and Black populations.⁶⁰ Furthermore, defi-

⁶⁰ The only direct evidence currently available regarding the coverage of the Hispanic population comes from coverage studies conducted in conjunction with two pretests for the 1980 census. The evidence from these studies is not inconsistent with the hypothesis

ciencies in certain age and sex groups are apparent. For example, Hispanic males are not enumerated as completely as females; undercoverage of young adults, particularly males, is relatively high; and there are notable reporting problems among the elderly. Estimates of coverage for three national-origin subgroups of the Hispanic population—foreign-born Cubans, Puerto Ricans, and the native population of Mexican parentage—strongly suggest that coverage for these groups taken separately and in combination (constituting less than two-fifths of the reported population of Spanish origin in 1970) falls between that of the White and Black populations. However, in view of the lack of appropriate data, specific estimates of coverage for the entire Hispanic population in 1970 would have to be based on a large number of invented assumptions of questionable validity. Such estimates could possibly be worthless and even very misleading.

⁶⁰—Continued

that undercoverage of the Hispanic population is intermediate between that of Whites and Blacks. The available results relate to coverage of housing units, however, so that the figures may not reflect the relative levels of coverage of population closely. In the coverage studies conducted following the censuses of Travis County, Texas and Camden, New Jersey, each taken in 1976, enumeration districts (ED's) were designated as either Spanish (i.e., over 30 percent of the residents were of Spanish origin) or non-Spanish and a sample of blocks was chosen from each group. In Travis County, there was no significant difference (at a 95-percent confidence level) between miss rates for housing units in Spanish areas (1.6 percent) and non-Spanish areas (0.6 percent). In Camden, the miss rate for housing units in Spanish areas (1.0 percent) was significantly lower than in non-Spanish areas (1.7 percent). (Camden's non-Hispanic population in 1976 was 48.3 percent Black.) These results are from T.W. Harahush and I. Fernández, "The Coverage of Housing Units—Results from Two Census Pretests," *Proceedings of the Social Statistics Section, 1978*, American Statistical Association.

Prospects for Measuring the Coverage of the Hispanic Population

PROSPECTS FOR DEVELOPMENT OF DATA

Our attempt to apply techniques of demographic analysis to estimate the coverage of the Hispanic population in the 1970 census has disclosed two areas in need of improvement before this approach can be expected to yield accurate estimates of census coverage for the Hispanic population or subgroups. These are (1) a precise and consistent definition of the Hispanic population and (2) data from non-census sources, such as vital statistics, immigration data, and administrative record data, which are consistent with the census definition. These problems may continue to plague efforts to evaluate coverage of the Hispanic population in the 1980 census.

For the 1980 census, the Bureau of the Census plans to use a completely self-designating or subjective method of defining the Hispanic population. A person will be classified as Hispanic if he or she chooses a Hispanic category in response to the question on Hispanic origin or descent which is to appear on the 100-percent census questionnaire. As much as data on Hispanic origin or descent are also available from the 1970 census, the Census Bureau will have data on the Hispanic population based on an essentially common general definition for the last two censuses.⁶¹ Even so, derivation of coverage estimates for the Hispanic population by the demographic method will continue to be difficult because of possible differences between these and other (non-census) figures on the Hispanic population resulting from shifts in the identification of individuals as Hispanic or non-Hispanic.

A division of the total "error" into the coverage and response components may be attempted through match studies in 1980. We are concerned, however, that the attempt may not result in reliable estimates of the components. Match studies may also be used to provide estimates of gross and net response error for the Hispanic population in 1980. They are likely to show that response variability accounts for a substantial portion of the measured error. Thus, although self-designated Spanish origin or descent may be an appropriate choice as the primary identifier of the Hispanic population, it will present difficulties in evaluating coverage in 1980.

⁶¹ The question on Spanish origin has been revised for the 1980 census, from the 1970 census question, "Is this person's origin or descent . . . ?" to read "Is this person of Spanish/Hispanic origin or descent?" This new format is expected to reduce errors caused by misunderstanding of the question and to produce more consistent data.

Demographic data independent of the census corresponding to the concept of Hispanic origin or descent will be needed in order to evaluate the census figures on the Hispanic population in 1980 by the demographic method. Vital statistics and immigration data following this concept over a long period will be required. One method of obtaining the requisite vital statistics is simply to ask a question about Spanish origin or descent on the birth and death certificates. The National Center for Health Statistics has proposed to the States that they modify their birth and death certificates to secure information on Spanish origin. So far, 18 States, generally those with the largest numbers of persons of Spanish origin, have agreed to secure such information. The first data to be tabulated from these new certificates will relate to 1978 and may become available in 1980. Data are needed for the other States and for a long period of years, however, if they are to be useful for coverage evaluation. Although such data would not be strictly comparable to census data because the concept is subjective and the (same or different) respondent would not necessarily have provided the same information for the census and the birth or death certificates, they may be sufficiently consistent to serve as a rough basis for census evaluation in the coming years for at least some portion of the Hispanic population.

Another possibility for obtaining vital statistics on the Hispanic population—one which does not involve any modification of the present birth and death certificates—is the coding of birth and death certificates according to Spanish surnames. Coding of Spanish surnames has the distinct advantage that it is relatively objective and can be applied retrospectively, making it possible to produce a series of consistent data for a number of years. These data could then be used to evaluate the census coverage of the Spanish-surname population in the younger ages in 1980.⁶² This procedure would have a number of drawbacks; these arise primarily from the lack of correspondence between Hispanic origin and Spanish surname as identifiers, as noted earlier. Moreover, estimates of the completeness of birth registration for this group are lacking.

Any application of the component method to the estimation of the coverage of the Spanish-surname population would require, in addition to the appropriate vital statistics, national data on net immigration or regional data

⁶² At this time (April 1979), it appears unlikely that Spanish surname will be coded outside the five Southwestern States in the 1980 census.

on net in-migration (e.g., State-of-birth data classified by age) for the five Southwestern States for the Spanish-surname population. Calculating coverage estimates for the entire United States with national data would alleviate this problem, but the problem of applying the present Spanish-surname list to the census data and the vital statistics for areas outside the Southwest would remain.

Coding of Spanish surnames could also be done (perhaps on a sample basis) for some sets of administrative records, such as Social Security summary earnings files, Medicare enrollments, or IRS tax returns for 1980. It would then be possible to compare the aggregate census figures for persons with Spanish surnames resident in the five Southwestern States or in the United States with similar figures from the Medicare files or the Social Security files. Aggregate comparison with tabulations from the Social Security summary earnings files has severe limitations, however, resulting principally from omissions from and duplications in the files. The coded records could be used more effectively in a matching study, which does not depend on the completeness of the file. For example, a sample of persons with Spanish surnames in the SSA/IRS files could be matched to the 1980 census records to evaluate the coverage of selected age groups in the Hispanic population.

In any application involving the use of a list of Spanish surnames to identify the Hispanic population, the many problems associated with this identifier, previously discussed, must be overcome. Research at the Census Bureau is now under way in an attempt to resolve some of these problems. Refining the Census Bureau's list so that it could serve as a standard list for use by the National Center for Health Statistics, the Social Security Administration, and the Immigration and Naturalization Service, as well as by the Census Bureau, is one goal of the research. The refined list may aid in the tabulation of the births and deaths of the Hispanic population and in the calculation of the corresponding birth and death rates, as well as in directly measuring coverage by such techniques as a case-by-case match with Social Security files. The research is also proceeding in the direction of adapting the list, or devising a second one, for use in identifying the Spanish-surname population outside the southwest.^{6.3}

Representatives of the Census Bureau and the Social Security Administration have been collaboratively exploring the issues involved in securing Social Security data classified by Spanish ancestry. The Census Bureau has received a tabulation of a 1-percent sample of persons included in the Social Security file and has attempted to identify those persons with Spanish surnames as a test of the feasibility of making this classification in 1980. The Census Bureau has

also indicated to the Social Security Administration its interest in having the application form for a Social Security number revised to include identification of Spanish origin or descent.

The number of illegal aliens in the United States is a subject which has received a great deal of attention in bureaucratic, political, professional, and popular writings and discussions. The range of the available estimates for recent years is quite large, from 1 to 12 million, and the methods used to derive the estimates are quite varied, ranging from conjecture based on enforcement data^{6.4} to statistical inference based on comparison of time series of aggregate administrative data,^{6.5} triple-system match studies,^{6.6} and demographic analyses of survey data at various dates.^{6.7} A direct survey has also been undertaken.^{6.8} The analytical research to date does suggest that the number of illegal aliens in the country and the *net* flow are far less than the highest conjectural estimates.^{6.9}

In a further attempt to apply demographic analysis to the estimation of the number of illegal aliens in the country, the Census Bureau has undertaken an analysis of trends in age-sex-cause-specific death rates for the group of States in which illegal aliens are believed to be numerous. This analysis also suggests that the number of illegal aliens in the country is probably not as large as the highest conjectural estimates and that large increases in the *net* flow of illegal aliens have not occurred since 1970.^{7.0}

To date, this and other research projects have not yielded any definitive or preferred estimate of the net flow or current population of illegal aliens. The question as to how many illegal aliens are in the country remains open.

^{6.4} Lesko Associates, Final Report: Basic Data and Guidance Required to Implement a Major Illegal Alien Study During Fiscal Year 1976, prepared for the Office of Planning and Evaluation, U.S. Immigration and Naturalization Service, Washington, D.C., October 1975.

^{6.5} Alexander Korns, "Coverage Issues Raised by Comparisons Between CPS and Establishment Employment," *Proceedings of the Social Statistics Section, 1977: Part I*, American Statistical Association, 1978, pp. 60-69.

^{6.6} Clarise Lancaster, and Frederick J. Scheuren, "Counting the Uncountable: Some Initial Statistical Speculations Employing Capture-Recapture Techniques," *Proceedings of the Social Statistics Section, 1977: Part I*, American Statistical Association, 1978, pp. 530-535.

^{6.7} David M. Heer, "What is the Annual Net Flow of Undocumented Mexican Immigrants to the U.S.?", paper presented at the annual meeting of the Population Association of America, Atlanta, Georgia, April 13-15, 1978.

^{6.8} J.A. Reyes Associates, *The Survey Design for a Residential Survey of Illegal Aliens*, report submitted to the Immigration and Naturalization Service, September 5, 1977. See also Statement of Robert Warren, pp. 704-706, in *Immigration to the United States*, Hearings before the Select Committee on Population, U.S. House of Representatives, Ninety-fifth Congress, Second Session, April 4-7, 1978, No. 5, U.S. Government Printing Office, Washington, D.C. 1978.

^{6.9} Select Committee on Population, U.S. House of Representatives, Ninety-fifth Congress, Second Session, *Legal and Illegal Immigration to the United States*, Serial C, December 1978. See also *Immigration to the United States*, op. cit. and Charles B. Keely, "Counting the Uncountable: Estimates of Undocumented Aliens in the United States," *Population and Development Review*, Vol. 3, No. 4, December 1977, pp. 473-482.

^{7.0} J. Gregory Robinson, "Estimating the Approximate Size of the Illegal Alien Population in the United States by the Comparative Trend Analysis of Age-Specific Death Rates", paper presented at the annual meeting of the Population Association of America, Philadelphia, Pennsylvania, April 26-28, 1979.

^{6.3} The basic data for this research is a 20-percent sample of all Social Security records. From this file, it is possible to tabulate the frequency of occurrence of every surname (Spanish and non-Spanish) in each State. Spanish surnames can then be identified on the basis of geographic (distributional) criteria as well as the usual linguistic and genealogical criteria. For a more detailed discussion of the research on Spanish surnames, see D.L. Word, J.S. Passel, B.D. Causey, and E.W. Fernandez, "Determining a List of Spanish Surnames by Analysis of Geographical Distributions," unpublished paper presented at the annual meeting of the Southern Regional Demographic Group, San Antonio, Texas, October 1978.

PLANS FOR EVALUATION STUDIES IN 1980

Plans for the evaluation of the coverage of the population in the 1980 census are still being formulated. These plans envisage an effort to evaluate the coverage of the Hispanic population of the United States, States, and possibly constituent geographic areas. It is planned to apply the various techniques of demographic analysis considered here for 1970 as well as extensions and adaptations of them that the data permit. The scope of this approach will necessarily remain limited, however. In spite of the steps being taken to expand the range of Hispanic data, particularly vital statistics, these will be of little utility for 1980 since generally the States are only beginning to collect data on births and deaths of Hispanic persons.

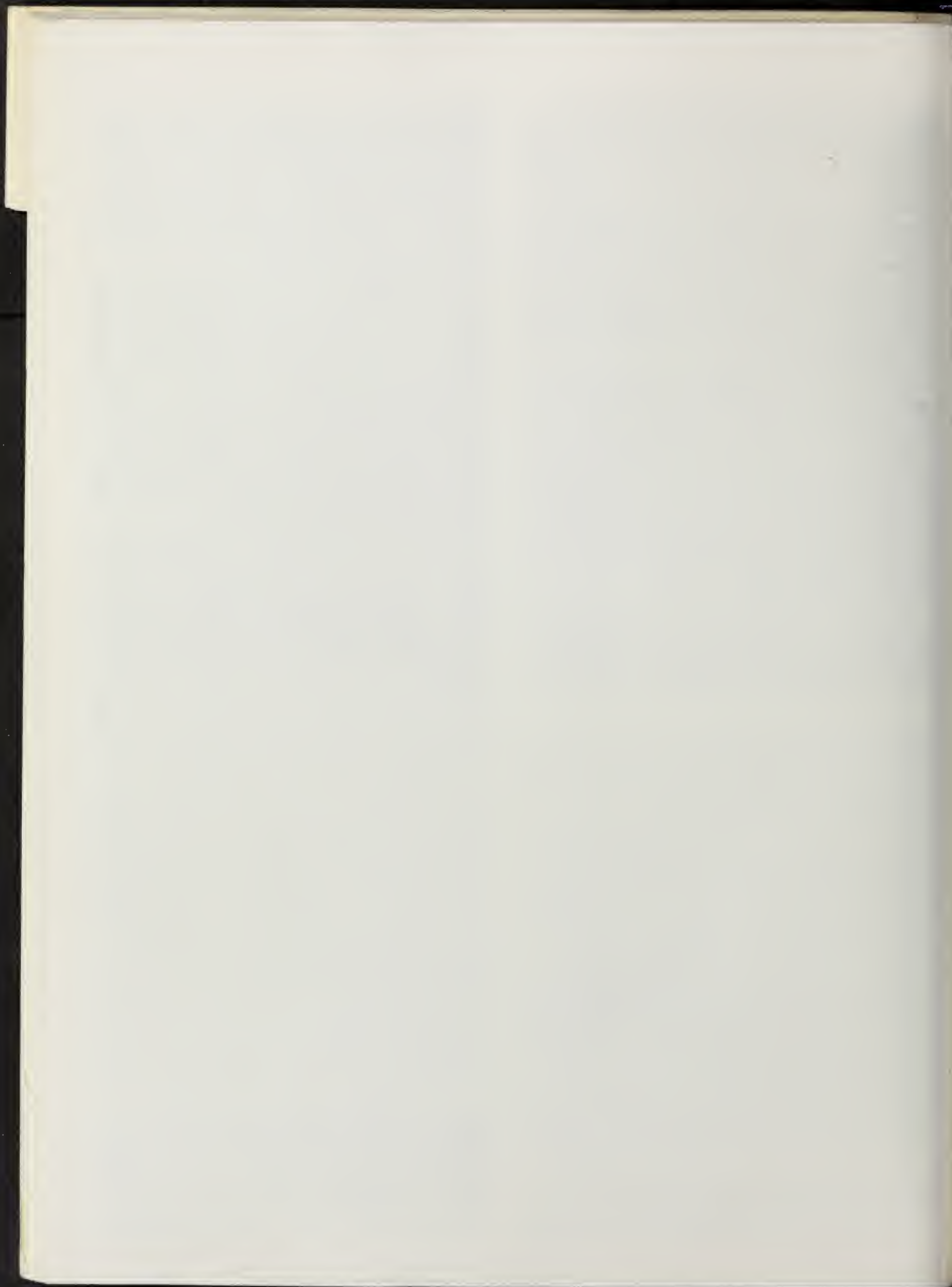
At present, principal consideration is being given to the conduct of a post-enumeration survey (PES), the results of which would be matched to the census records on a case-by-case basis. Individuals would be identified as of Spanish origin or descent in the post-enumeration survey and this determination would establish their identification as Hispanic for the purposes of the study. It is quite possible that the census-PES match study will provide satisfactory estimates of coverage for the Hispanic population at most for the United States as a whole and that other methods will be required to produce estimates for the major political subdivisions of the United States.

Information from the match study on the variation in the coverage rates of the Hispanic population according to socioeconomic characteristics for the United States may be employed in a synthetic or regression design, in combination

with census data on the geographic and socioeconomic distribution of the Hispanic population, to prepare estimates of coverage for the Hispanic population of the major political subdivisions of the United States. Coverage rates according to socioeconomic characteristics for the general U.S. population may permit the calculation of coverage rates for the Spanish population in the United States as a whole in the event that satisfactory Hispanic coverage rates for the United States are not available from the match study.

A further match of the post-enumeration survey with the Social Security/Medicare/IRS files on the basis of Spanish surname is being considered. The results of such a study could be used to adjust the original census-PES estimate of coverage for understatement, that is, to allow for groups which tend to be omitted from censuses and surveys. Presumably the administrative files include a representation of persons living in units that were omitted from the census or improperly reported as vacant and persons whom householders carelessly or deliberately excluded from census reports. Hopefully, this device will serve to encompass the measurement of illegal aliens of Hispanic origin, even though this group cannot be identified separately.

Given the uncertainties of the triple-system matching scheme, the response variability in the definition of the Hispanic population, and the deficiencies in the various non-census data sources, it is not clear at this time whether reliable estimates of coverage of the Hispanic population can be developed nationally or at any subordinate geographic level for 1980. A major effort will be made to do so, however.





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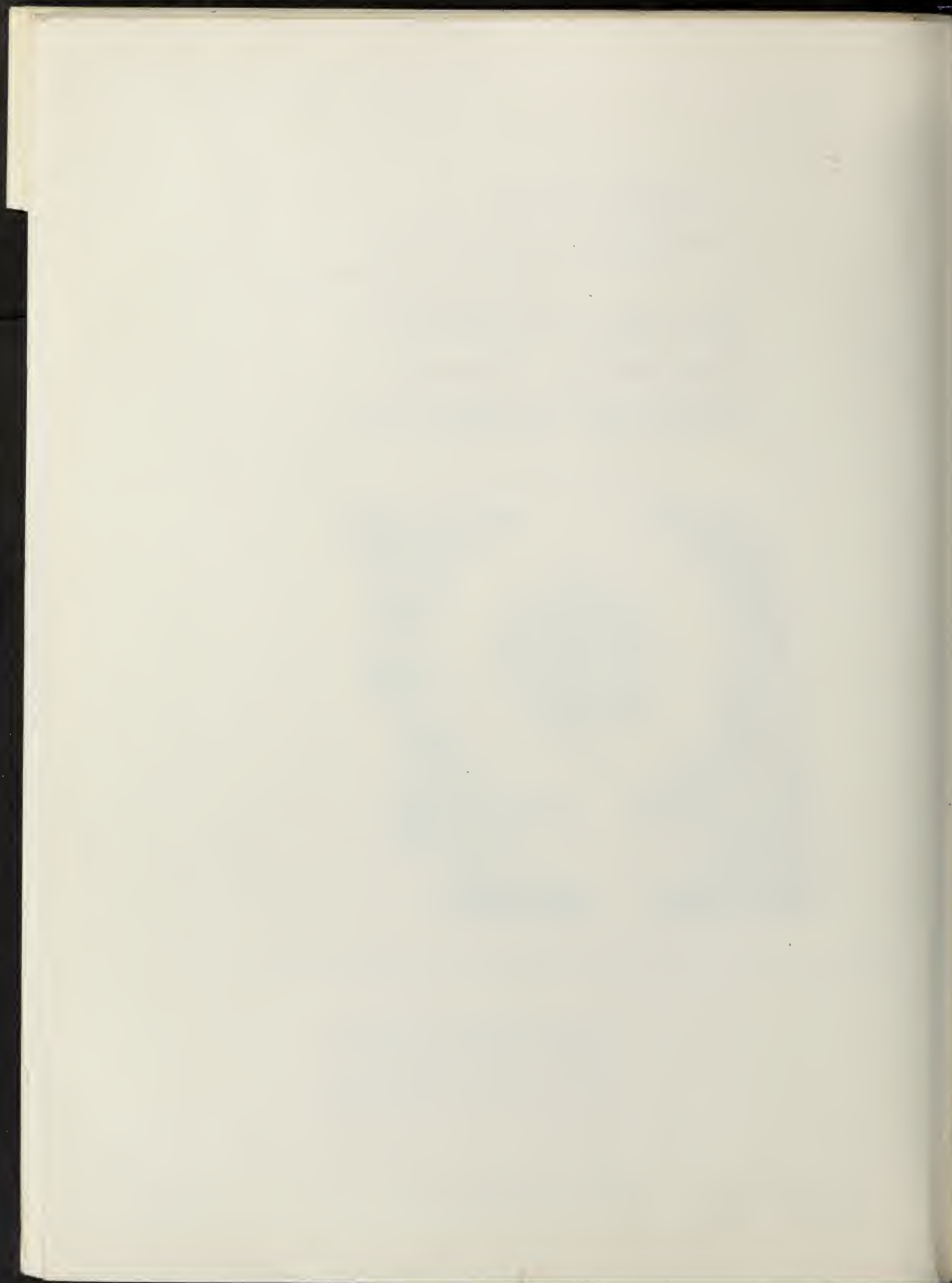
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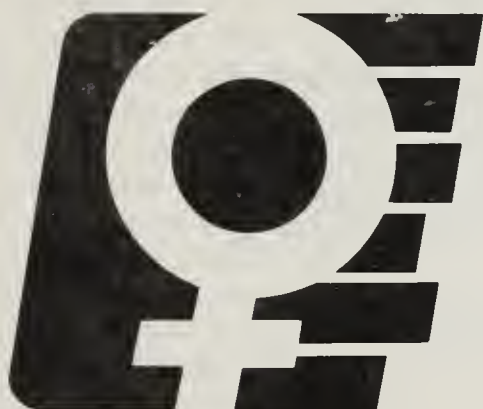


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ACKNOWLEDGMENTS

Publication of this report was coordinated by Karen M. Mills, Statistician, Population Division. Editorial review and preparation of the report for printing were supervised by C. Maureen Padgett, Publications Services Division.

Library of Congress Cataloging in Publication Data

Main entry under title:

Census Bureau Conference on Issues in Federal Statistical Needs Relating to Women.

(Current population reports: Special studies: Series P-23; no. 83)

1. United States—Statistical services—Congresses. 2. Women—Statistical services—Congresses. I. Reagan, Barbara Benton, date. II. Census Bureau Conference on Issues in Federal Statistical Needs Relating to Women, Bethesda, Md., 1978. III. Series: United States. Bureau of the Census. Current population reports: Special studies: Series P-23, no. 83.

HA203.A218 no. 83 [HA37.U55] 312'.0973s [001.4 '22]

79-14556

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by a draft on a U.S. bank. *Current Population Reports* are sold in two subscription packages: Series P-20, P-23, P-27, and P-60 are available for \$40.00 per year (\$10 additional for foreign mailing); Series P-25, P-26, and P-28 are available for \$70.00 per year (\$17.50 additional for foreign mailing). The single-copy price of this report is \$4.75.

PREFACE

With the approach of the 1980 Census of Population and Housing, there have been increasing interest in and concern with the data needs relating to the status of women. It is imperative that reliable and pertinent information be available for making sound legislative decisions, for use in eliminating discrimination barriers, and for studying institutional changes. These data needs and concepts extend across all surveys and analyses done by agencies and organizations in both the public and private sectors.

It was felt appropriate in light of these objectives that the Bureau of the Census sponsor a conference on Issues in Federal Statistical Needs Relating to Women. The conference was held April 27-28, 1978, in Bethesda, Md. In addition to discussions of the papers presented, the conference permitted an exchange of ideas among those with extensive experience and interest in the field.

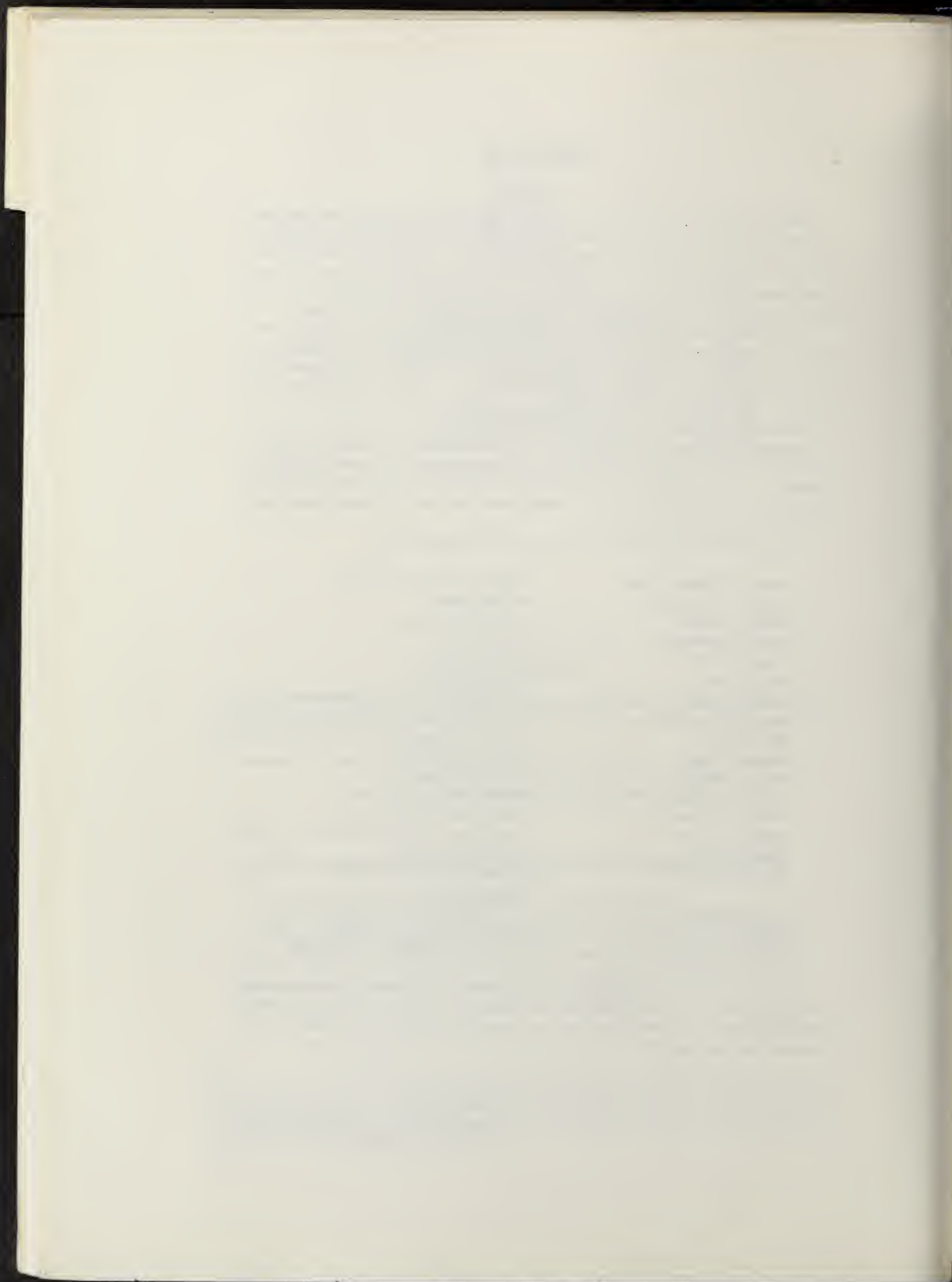
This volume contains the conference papers, revised to reflect the authors' responses to comments and discussion by participants of the conference. In addition, it contains responses from Federal statistical agencies to recommendations and issues raised at the conference. We are indebted to the authors and conference participants for the high quality of the conference and for the contribution they made to developing the data needs relating to the status of women.

The conference benefited from a Steering Committee composed of—

Barbara B. Reagan, Chair	Southern Methodist University
Elizabeth Abramowitz	The White House
Barbara A. Bailar	Bureau of the Census
Nancy Smith Barrett	Urban Institute
Francine D. Blau	University of Illinois
Ann D. Casey	Bureau of the Census
Marie D. Eldridge	National Center for Education Statistics
Joseph L. Gastwirth	George Washington University
Shirley Kallek	Bureau of the Census
Daniel B. Levine	Bureau of the Census
Mary A. Marshall	Virginia State Legislature
Charlotte F. Muller	City University of New York
Janet L. Norwood	Bureau of Labor Statistics
Mollie Orshansky	Social Security Administration
Harriet B. Presser	University of Maryland
Carol Raykowski	National Association of Women Business Owners
Patricia Schroeder	U.S. House of Representatives
Eleanor C. Smeal	National Organization for Women
Phyllis A. Wallace	Massachusetts Institute of Technology

Particular thanks to Barbara Reagan, who provided the technical coordination and planning for the conference, and who was the technical editor for this volume. To all who participated in the conference and others who assisted in the project, the Bureau of the Census is extremely grateful.

Shirley Kallek
Associate Director for Economic Fields
Bureau of the Census



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I.
Introduction



CHANGING ROLES OF WOMEN AND STATISTICAL POLICY

Juanita M. Kreps
U.S. Department of Commerce

The theme for these remarks is change. This conference is about change—about the changing perception of women in society, about the need to find measures of the changing roles and economic status of women, about the changed role of the U.S. Department of Commerce (with regard to statistical policy), and about potential changes throughout the Federal Government in the wake of current events.

To introduce today's conference, there is, it seems to me, no better statement of purpose than the first paragraph of the conference paper prepared by Watts and Skidmore—and I would like to call your attention to that and quote the very first statement.

They say, "The statistical concepts used to describe our economy and society, and the methods used to collect data for their measurement, were designed when the world was assumed, by and large, to be made up of households with a particular family composition—a working husband (the breadwinner), plus a nonworking wife and two children, all dependent upon his earnings for their economic support. The membership of these families was considered fixed—the parental couple for the duration of their adult lives and the children until they, in turn, grew up and established their own similarly constituted families."

Then, this statement from the authors, which I would like to underscore, "Whether or not U.S. society ever really fit that description, clearly it does so no longer. Many of our statistical series, therefore, are data shoehorned into what has become an ill-fitting and constraining framework."

Or, one could take Nancy Barrett's same point in which she says, "Household surveys based on the assumption that the typical family consists of breadwinner husband, nonworking wife, and children are hopelessly out of touch with today's arrangements. Less than 16 percent of all families fit this stereotype. Over half the wives in husband-wife families are in the labor force, and over one-third of all families are headed by single adults."

So it goes. As an economist with a special interest through the years in labor markets, I have often seen the need for better statistics on the economic status of women, and, along with my graduate students, I have complained bitterly to all who would listen for better statistical information and for a more accurate interpretation of the data available. Particularly, I have in mind the consistent tendency to understate the labor force activity of women.

It has been heartening to learn, since coming to Washington, D.C., that my colleagues are at least as eager to obtain more detail and more objectively presented statistics in this area, and it will be a great satisfaction to me, as Secretary of Commerce, if I can help to fill the statistical voids and correct

the nomenclatural and categorical anachronisms that obscure or distort our understanding of what is really happening to women in America today.

Recently, some small progress has been made. The term "head of household" will not appear on the 1980 census forms. The President's task force on women business owners currently is assessing the inadequacy of statistics on women business entrepreneurs and the obstacles that they face in the marketplace.

This task force will soon make recommendations dealing with problems that women have in gaining access to capital markets, to training and technical assistance, and to Federal procurement. With the incorporation of the census of women-owned business into our 5-year economic census program, we will receive regular updates of this measure of women's economic status.

But, this conference on women's issues and Federal statistics has been called to discuss problems and solutions in other areas, and, in the course of this conference, I hope we will examine many types of economic and social statistics for our needs are broad and comprehensive.

I should like to note, briefly, a few that are of current interest. First, a comment on fertility trends. We have reasonably good statistics on childbearing trends, but we need to know much more about their implications. For the last two decades, fertility rates have been declining in the United States from the peak of the baby boom era in 1957 to an all-time low in 1976. Were women to continue to bear children at the 1976 rate, there would be fewer than 1.8 children per woman.

All of these figures we carry around with us, but although the 1977 fertility rate showed a slight rise over 1976, 1977 marked the sixth year in a row in which fertility rates were below the level needed for long-run replacement of the population. On the basis of monthly birth rates in the last half of 1976, a substantial rise in fertility was anticipated for 1977. Yet, that expectation was confounded by a sharp drop in the birth rate during the last half of the year.

Moreover, the provisional rate of births in January 1978 was close to the lowest in our history. The predictions as to what the future holds are little better than guesses, we have learned—by sad mistakes; but one thing does seem clear. Postponing marriage and childbearing is expanding women's educational and occupational options. Moreover, it may also expand the options of those women's children—when and if they have them.

A second category we ought to pay particular attention to is education and occupation. Statistics on educational levels reveal marked increases during the past few years in the numbers of women entering college. In the past, females

were less likely than males to fall behind in school, and, while in elementary grades that was the case, they were also more likely to graduate from high school.

But women were much less likely to go to college. Today, however, women in the 18- to 20-year age group are just as likely as men to enter college. Moreover, once in college, women are more likely to finish and more likely to enter graduate schools and receive advanced degrees than ever in the past.

These trends should produce for us a generation of women far better prepared for lifetime careers in the labor force than were their mothers or grandmothers. In looking ahead, we must concern ourselves with the ability of these college-educated women to find satisfying work opportunities, for surely, such women will be less inclined to take traditional female jobs—in clerical, secretarial, factory settings, etc. Those who do so, because they cannot find other jobs, will likely change the nature of those occupations.

One other point on education, about which many of us in the past have written, is that although many more women are entering college, many still choose courses of study that prepare them best for careers in teaching—not a field where future employment opportunities are, at the moment, particularly promising.

More thoughtful review of alternative careers, better data on occupational prospects, and better use of the data might help to avert an even more serious labor glut than already exists in certain professions. One might expect higher educational attainment among women to further the tendency toward small families and, perhaps, to lead to stable, longer marriages in the future. However, such evidence as we have suggests that this expectation is being realized only in part.

Statistics show that women who receive advanced degrees, who are, of course, also more often employed in the good jobs, are quite likely to get divorced. Analyses by Sawhill and others have been helpful in this general area, but we need additional data and analysis that will further clarify these interrelationships between education, careers, levels of job, and family lives of men and women.

As the third category, we ought to consider carefully what we know and don't know about income levels—poverty, in particular, and the way that is affected by the status of the head of household, if we are still allowed to use that term.

We need better statistics that depict the relationship of sex of family head to poverty. Notwithstanding the comic strip characterization of the credit card wielding middleclass woman as the source of all family overspending, the fact is that, on the contrary, we are in disproportionate numbers the victims of poverty.

You know the figures. More than one-third of all poor persons in 1976 were members of families headed by women with no husband present. Half of all poor children were members of such families. Nearly two-thirds of all children in families maintained by Black women were living in poverty. Beyond these statistics, we know very little about how members of female-headed families are affected by Federal program benefits, alimony, and child support.

These are but a few of the areas in which the changing role of women has created a need for better measurement and analysis. Clearly, we need detailed information on the special requirements of women in general, but, more especially, on certain subgroups of women by age, race, etc. The effective-

ness of public policy in dealing with issues affecting the status and the equality of women needs to be assessed.

We must be able to weigh the positive and the negative aspects of women's new roles and their new lifestyles. To the extent that job access is being denied, we need to calculate the resulting effects. Each of us can cite specific examples of women who have been denied opportunities because of prejudices and preconceived notions of what is properly considered "women's work." We need to know the extent of this pattern of thought and what the implications are.

Statistics do more than tell us what is happening. Statistics also cause things to happen. Our political system responds to problems, but it responds more quickly to problems that are documented clearly and, thus, elevated in the hierarchy of national priorities.

A vague sense of injustice is not adequate to attract attention and action. It takes statistics to influence Government's decisions. It takes statistics to determine the flow of dollars. Individual cases of discrimination can be ignored, rationalized, hushed up, or settled with little fanfare. It is much more difficult to ignore persistent and shocking statistics.

There are many questions which better statistics will help us to answer. Is the continued male-female earnings differential caused primarily by differences in educational attainment or work experience between men and women—or is there a large residue of difference left unexplained by these factors?

If discrimination is partially to blame, how can its extent and impact be better measured and better publicized?

As you know, the primary purpose of the conference is to determine what statistics we need in order to assess the social and economic status of women, as compared with the general population and other groups in it. We may recommend that some units of measure be changed, that an expanded universe of attributes be measured, or that traditional measures give way to a more contemporary assessment.

If this conference is a success, it will prompt Federal policymakers and statisticians to develop some new indexes of women's present status and their probable future. I am keenly interested—personally and officially—in the issues that will be discussed.

Within the past year, the U.S. Department of Commerce has been assigned responsibility for Federal statistical policy and standards—a function previously delegated to the Office of Management and Budget. This fortuitous blending of official responsibility and personal interest has given me, as Secretary of Commerce, an exciting new role. Commerce is not only the principal data collector for the executive branch but also now, the statistical policy coordinator. We will, therefore, be playing a key role—along with other Federal agencies—in determining what statistics are gathered by the Government and what proportion of the budget will be spent on obtaining the information.

The results of this conference will directly affect future positions taken by the Department of Commerce concerning these policies and standards. As chairperson of the Statistical Policy Coordination Committee, a Cabinet-level committee that advises and assists the President in making improvements in this whole general area, I shall be sensitive to any new ground that we break in the context of this conference.

But, more importantly perhaps, being personally committed to ending discrimination based on sex, I shall do

INTRODUCTION

everything I can to eliminate the statistical deficiencies that stand between us and that goal.

In summary, then, I view this conference as a watershed between the obsolete and the useful. As our society has changed, our needs for information have also changed. It is hardly surprising that our statistical system has failed to keep pace with the times. This conference and the resulting final report are meant to tell us how to catch up and how to look ahead.

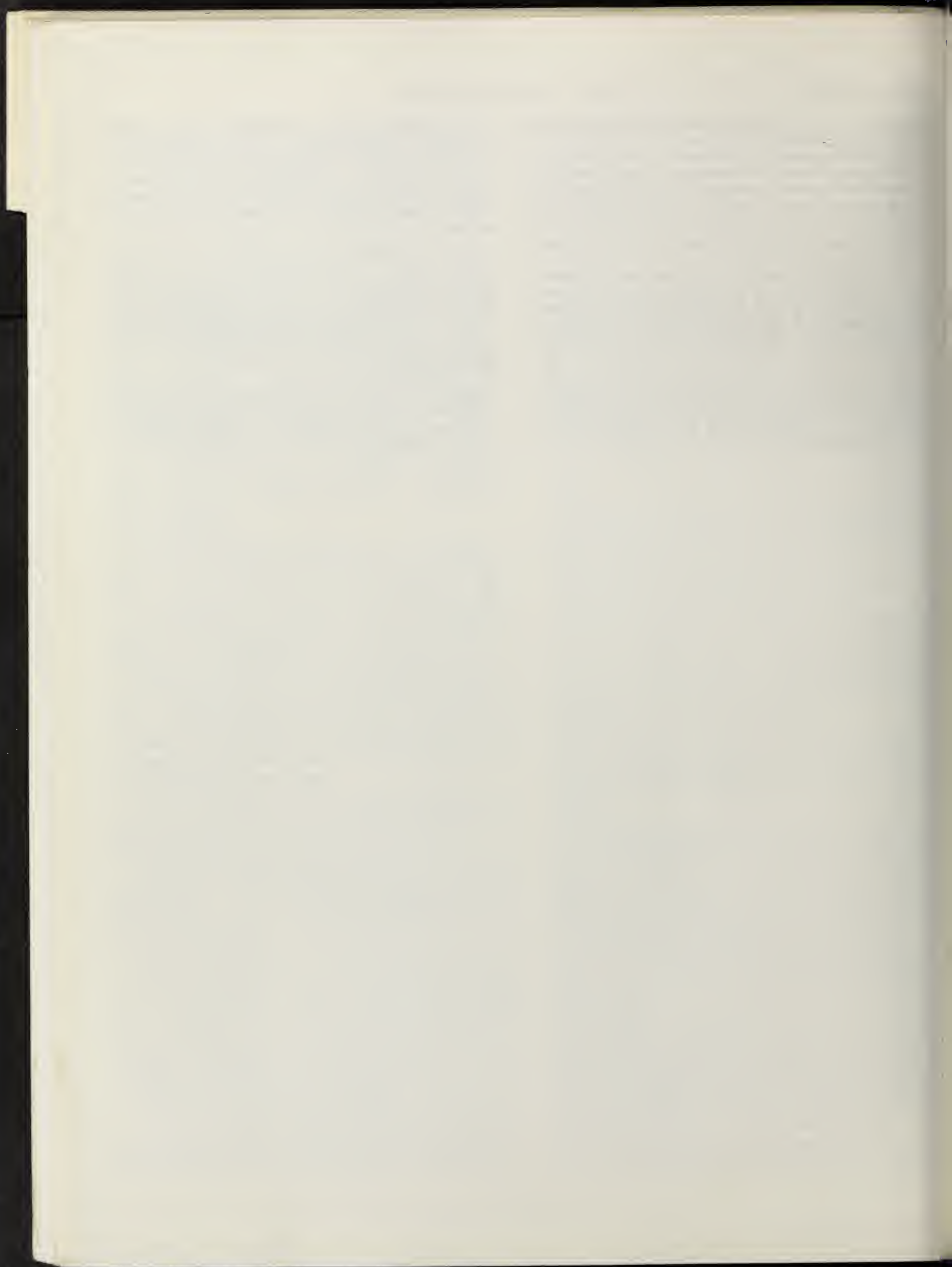
If we can get the proper resources, some needed statistical improvements can be made quickly through revised presentation of the existing data. To modify the data base itself requires more time and involves other considerations—privacy, paperwork burden, and response burden are among the constraints on any new data collection activity.

There are also questions of survey design, questionnaire wording, and evaluation—all of these must be addressed. Needless to say, we face budgetary constraints and the need to consider the data inadequacies of many groups, along with those inadequacies of data on women.

This conference needs to be concerned, therefore, with the practicality of implementation, as well as with the needs we face. Again, I share the frustrations that you experience as producers and users of the data, and I pledge you my commitment to listen and follow up after this conference in order to insure that the issues you raise will be adequately addressed.

You may recall the lines, "A single death is a tragedy; a million deaths is a statistic." That quote, you may recall, comes from Joseph Stalin, who was one of the great statistic makers of all time, and although he is not my favorite prophet, his observation does contain a useful insight; to wit—statistics may be mute on the subject of human pathos, but they are the only language we have for describing trends and events of broad proportions.

Without statistics, we can weep over cases and wring our hands with sympathy for the plight of those within our scope, but we cannot marshal the collected emotions of society to produce change.





II.
Income



INCOME: INTRODUCTION

Joseph Gastwirth
George Washington University

The post-World War II era has witnessed a dramatic change in the participation of women in the labor market. In April 1950, only 28.3 percent of the women 16 years old and over worked or looked for work, while in March 1976, 46.8 percent were in the labor market. Moreover, the turnover ratio, the ratio of the number of persons in the labor market at any time during the year to the average labor force, has shown a significant decline, from 1.4 to 1.2 for women. Thus, not only are a greater percentage of women working than ever before, but women are more permanent members of the labor force.

In contrast with the dramatic changes noted above, the fact that females earn approximately 60 percent of the salary of men has remained virtually constant from 1955 to 1975 [1]. Although several factors may explain some of this earnings differential, e.g., women form a greater percentage of recent entrants to the labor force and women with children may prefer to work near home, I know of no study which has

explained the entire gap, even when the study focuses on a single occupation.

Rather than review the huge literature on wage equations, Nancy Barrett wisely has chosen to provide us with a survey of recent trends in female labor market activity and its implications for the collection and analysis of data. Her discussion of the effect that the increased role of women in the labor market has on the concepts underlying the Current Population Survey, on the special data required to properly study the labor market situation of women, and on the necessity of longitudinal data are well worth the serious consideration of policy-makers.

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DATA NEEDS FOR EVALUATING THE LABOR MARKET STATUS OF WOMEN

Nancy Smith Barrett
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and
American University

Few people would question the significance of the unprecedented growth in female labor force participation over the past decade. Perhaps the most outstanding feature of the exodus from the home to the marketplace is the involvement of a large number of married women with children. Over half the Nation's children under 18 years old now have mothers who work.

The consequences of the growth of the female labor force for the labor market, family life, and household incomes have been documented and evaluated, and predictions of longer range trends and their effects proliferate.¹ But, regardless of one's assessment of these outcomes, the rapidly changing economic role of women necessitates a reconsideration of traditional data concepts in the area of income and employment.

Social scientists and policymakers often underestimate the importance of the choice of data concepts and the availability of data in analyzing social and economic behavior and in designing and implementing public policy. Data availability not only limits the hypotheses one is able to test and the questions one can answer, but data concepts often suggest the questions themselves or, at least, influence the researcher in terms of the way questions are formulated. Methodologists have long stressed the importance of theory to data gathering. However, we are now in such an age of empiricism that data have become the master of the theorist, rather than the other way around.

At no time is the need for testing new hypotheses and breaking out of traditional mindsets more crucial than in a period of rapid social change. Yet, it is at such a juncture that the data concepts and measures used in the past are no longer always relevant for analyzing new problems. This paper will address some of the data gaps associated with the increased participation of women in the labor force and will identify data needs for policy research in this area.

SOME RECENT TRENDS IN FEMALE LABOR FORCE PARTICIPATION

Between 1965 and 1976, the number of women working or looking for work increased by 12.2 million. This represented an increase in the female labor force participation rate from 39.3 in 1965 to 47.4 in 1976.

By far, the greatest increase in participation was among

wives living with their husbands, particularly those with small children. Between 1965 and 1975, the labor force participation rate of wives rose from 34.7 to 44.4. In 1960, the participation rate of married women with children under 6 years old was 18.6 percent. As shown in table 1, by 1965, it was 23.3 percent, and, by 1976, it had risen to 37.4 percent.

Along with the growth in participation of married women with children has been a trend to later marriages, fewer children, and increased incidence of divorce. For instance, the number of births per 1,000 women 15 to 44 years old dropped from 113.2 in 1960 to 63.0 in 1975. Furthermore, the proportion of all families headed by women has risen from 10.5 percent in 1965 to 13.3 percent in 1976. Since 1970, about 60 percent of the increase in female-headed families has been due to divorce [16]. These mothers have much higher labor force participation rates than wives. In March 1975, 74.7 percent of divorced women with children under 18 years old (and 66 percent of those with children under 6 years old) were in the labor force.

Although smaller families and marital instability have contributed to the growth of the female labor force, increased participation within family-status categories is responsible for most of the increase. George Perry, for instance, shows that of the 8.7 percentage point increase in female labor force participation between 1967 and 1975, an increase of 1.8 points was due to shifts among family-characteristic groups, while an increase of 6.9 points was due to increases in participation within family-characteristic groups [23]. In a similar analysis, Ralph Smith finds that 72 percent of the growth in the female labor force between 1971 and 1975 was due to increases in within-group participation rates [27].

One reason for the rapid rise in female labor force participation is that women are staying in the labor force longer. Labor force separation rates are much lower now than in the early 1960's, and the U.S. Department of Labor estimates a substantial increase in the work-life expectancy of women, particularly among married women with children [6]. These changes mean that, in addition to an increase in relative numbers, the character of the female labor force has changed as well. Instead of being an intermittent work force, lacking a commitment to a career or a desire to acquire seniority, and with little interest in long-term opportunities for advancement, women are increasingly demonstrating a disposition to continuous labor force participation, regardless of whether they marry and have children. This means the dead-end job, typically assigned to females under the assumption that they will

¹ See, for example, [1; 18].

Table 1. Trends in Labor Force Participation of Women, by Marital Status and Presence and Age of Children

(In thousands)						
Year	Never married	Widowed, divorced, and separated		Married, spouse present		
		Total	Divorced	No child under 18 years old	Children 6 to 17 years old	Children under 6 years old
1960						
Labor force	5,401	5,270	1,222	5,692	4,087	2,474
Labor force participation rate	44.1	42.0	71.6	34.7	39.0	18.6
1965						
Labor force	5,912	5,536	1,523	6,755	4,836	3,117
Labor force participation rate	40.5	39.5	73.3	38.3	42.7	23.3
1970						
Labor force	6,965	5,891	1,927	8,174	6,289	3,914
Labor force participation rate	53.0	39.1	71.5	42.2	49.2	30.3
1975						
Labor force	8,464	6,932	2,881	9,701	6,791	4,437
Labor force participation rate	56.7	40.7	72.1	43.9	52.3	36.6
1976						
Labor force	9,083	7,181	3,146	7,860	7,270	4,424
Labor force participation rate	58.9	40.9	71.4	43.8	53.7	37.4

Source: Bureau of Labor Statistics.

on drop out of the labor force, is no longer acceptable to many women.

As women extend their working lives and demonstrate a strong attachment to the labor force, there is a loss to the whole economy when employers continue to view them as intermittent workers. For instance, if employers continue to assume that women will drop out of the labor force to have children, they may be denied training opportunities in firms, or they may be barred from access to jobs where they will require on-the-job training. In the days when women's labor market activity was more sporadic, it may have been uneconomic to invest in large amounts of costly training. But, today, the average married woman with children will spend about 25 years in the labor force. Furthermore, a sizeable proportion will remain childless and maintain a work history comparable to that of men. Viewed in these terms, there clearly are long-term gains associated with providing better job opportunities to a pool of committed female workers with a wide range of skills and talents.

As the female labor force has grown rapidly over the past decade, the labor market has not been able fully to accommodate the change. For one thing, barriers to occupational mobility remain. For various reasons, women remain heavily

concentrated in relatively few stereotypically female occupations. In 1976, for example, over two-thirds of employed women held jobs as nurses, librarians, teachers, social workers, clerical workers, and service workers. As the female labor force has grown, women have crowded into these occupations, depressing wages and increasing unemployment. For instance, between 1965 and 1975, 44 percent of the growth in female employment was in clerical jobs. As a result, the proportion of all female jobholders in clerical jobs rose from 31.8 percent to 35.1 percent. At the time, clerical unemployment rose from 11.1 percent in 1965 to 14.6 percent in 1976, and the average clerical wage dropped sharply, relative to the average wage for the work force as a whole.

Another barrier is in opportunities for advancement. One reason that women's upward mobility is limited is their lack of training opportunities, stemming from the belief that women will be intermittent workers. Furthermore, traditional sex-role attitudes contribute to the opinion that men, not women, should be given supervisory responsibilities. Yet, the statistical evidence is clear that differences in opportunities for advancement over a person's working life are the principal reason why men's wages are higher, on the average, than women's. Although equal pay rules and equal employment

opportunity guidelines have narrowed the gap in entry-level pay between men and women, barriers to upward mobility remain and serve to depress women's wages in later years. While females in the youngest age brackets earn about 85 percent of similarly qualified males, the ratio drops to around 50 percent in middle years [4; 7].

As women have increased their labor force participation, strengthened their long-term job commitment, and sought more responsible job opportunities, the average earnings of full-time, year-round women workers have actually declined in relation to men's over the past decade, and the relative unemployment rate of women has increased. The passage of the Civil Rights Act of 1964 coincided with the emergence of more egalitarian views about sex roles and raised hopes that equal employment opportunity would be available as women's job market commitment became more like that of men. But although public attention to equal employment opportunity laws and affirmative action plans highlight individual success stories, the overall record is not encouraging. To the extent that lack of progress to date reflects inadequate information about the characteristics of women workers, improved labor market data relating to women workers will be an important vehicle for change. Furthermore, better data can aid analyses of the mobility barriers women face, providing a basis for policies that will facilitate and accelerate the adaptation of the labor market to the changing composition of the work force.

IMPLICATIONS OF GROWTH IN THE FEMALE LABOR FORCE FOR DATA COLLECTION

The growing propensity of women to work outside the home has two major implications for traditional labor market data concepts. First, household surveys based on the assumption that the typical family consists of a breadwinner husband, nonworking wife, and children are hopelessly out of touch with today's arrangements. Less than 16 percent of all families fit this stereotype. Over half the wives in husband-wife families are in the labor force, and over one-third of all families are headed by single adults.

A second factor necessitating changes in labor market data concepts is that data needs for analyzing women's labor market behavior and status are different from those used to analyze men's labor market behavior and status. Given the way our society is organized, nonmarket options remain more significant in the labor market decisions of women than men. Some measures of the factors influencing these options and how these are changing must be included in any explanation of women's labor market behavior. Then, too, snapshots of a woman's characteristics and her labor force status at a point in time (such as those obtained from the Current Population Survey) will not provide a complete picture. For men, once school is completed, life-cycle events usually have very little impact on the decision to participate in the paid labor force.² Further, since participation is usually continuous, age minus years in school can be accepted as a proxy for work experience. For women, on the other hand, a longer run view is

² As two-earner households become the rule, rather than the exception, men will undoubtedly begin to assume more responsibility for domestic activities. Hence, their labor market decisions may become increasingly predicated on factors like marriage, divorce, and the presence of children. This means that the inclusion of noneconomic variables and a life-cycle perspective will also be desirable for analyzing the labor market status of men.

required both to assess the relation between life-cycle transitions (such as marriage, childbirth, and divorce) and labor force participation as well as to obtain a profile of work experience. These factors are important not only in explaining participation behavior but also for understanding differences in wages, occupation, and other measures of labor market status between men and women.

Treatment of Women in Household Surveys

The most comprehensive source of data on income, employment, and other measures of labor force status is the Current Population Survey (CPS). The CPS is a survey of approximately 47,000 households conducted each month by the Census Bureau for the Bureau of Labor Statistics. It provides data on the labor force status of individuals as well as such characteristics as age, sex, race, marital status, number and age of children, hours of work, and duration of unemployment. The March and May surveys provide data on income, broken down by source. Furthermore, special supplements to the CPS are conducted from time to time, designed to provide more detailed statistics on special aspects of labor force activity.³

Although there are other sources of data on employment and earnings (data provided by firms, Social Security records, Internal Revenue data, and longitudinal surveys), the CPS is the most comprehensive source, in that it combines a wide range of information on the personal characteristics of workers with information on their labor force status and income. Thus, it can identify differences in earnings, employment, and labor market participation, by race, sex, age, marital and family status, education, and geographic area. A major limitation is that it provides only point-in-time estimates that do not permit tracking of individuals over extended periods.⁴

A problem with the tabulations provided by the Bureau of Labor Statistics and the Census Bureau from the household survey is that they make implicit assumptions about family structure that are becoming increasingly inconsistent with family patterns today. One example is the use of the term "household head" in describing the male in husband-wife families, regardless of whether the wife earns more than the husband or whether one or both tells the interviewer that the woman is the head.⁵

The January 1978 issue of *Current Population Reports*, Series P-60, defines household head as follows: "The head of a household is usually the person regarded as the head by members of the household. Women are not classified as heads if their husbands are resident members of the household" [30].

Apart from the analytical problems presented by this

³ For a detailed description of Current Population Survey and its special supplements, see [33; 35].

⁴ The Work Experience Survey, an annual supplement to the CPS conducted each March, asks the respondent about his/her labor force experience over the previous year. The WES is a valuable source of information about length of completed spells of unemployment and periods of labor force inactivity not available from the monthly survey. However, it does not provide a long-term picture of an individual's labor force experience. For a discussion and applications of the Work Experience Survey, see [2; 19].

⁵ The Bureau of Labor Statistics is currently developing alternative ways of tabulating and publishing family data without the designation of a "head." However, the Census Bureau continues the practice. For a discussion of the family head concept, see [22].

practice, the psychological aspects should not be ignored. For many people, the fact that the Federal Government categorizes husbands as household heads in official surveys contributes to a belief in male dominance and demeans wives. However, the problems posed for analytical use of the CPS are also important. Many of the published data include information only on the head. For instance, much of the income data provided in the *Current Population Reports*, Series P-60, provide income breakdowns by age, race, educational level and work experience of the head only. Since wives are excluded from headship by definition, this means that information on the characteristics of wives by family income category is unavailable, regardless of whether the wife's earnings are the principal or sole source of the family's income.

Table 2 provides a breakdown of household characteristics in 1976. Less than two-thirds of all families are husband-wife families, and, in half of these, the wife is in the labor force. Designation of headship does not raise a problem for families headed by single adults, since women can be classified as head of household if they are not living with their husbands or fathers. Among husband-wife families, however, less than half of all husbands are the sole breadwinners. Further, about 10 percent of all employed wives are the only wage earners in their families and about 12 percent of wives earn more than their husbands. Presumably, information about those wives would be more relevant to many types of analysis than the information that is currently provided on the husband only.

Another problem is that preconceptions of stereotypical roles of family members can seriously bias responses. For in-

stance, the CPS *Interviewers Reference Manual* instructs the interviewer in asking "What was...doing last week?" to include the examples "working or something else" for adult males, "keeping house or something else" for "housewives," and "going to school or something else" for teens. If such leading suggestions condition the response, it is possible that jobless women and teens will report themselves as keeping house or in school, even if they are looking for work and in the labor force. Furthermore, if they have stopped looking for work because they think they can't find a job, they are less apt to show up in the official measure of "discouraged workers" than adult males. Adult males, on the other hand, are led into reporting themselves in the labor force or discouraged.

These considerations are only examples of the difficulties associated with making outdated assumptions about the "typical" family structure in the household survey. As a first step in evaluating Federal statistical needs as they relate to the labor force status of women, the Current Population Survey, its adjunct surveys, and various special household surveys that are conducted from time to time must be carefully reviewed with the purpose of eliminating concepts and practices that automatically place women in a secondary role. Furthermore, published tabulations should be revised to incorporate information about all adult family members, not husbands only.

Special Data Needs for Evaluating Women's Labor Market Status

Despite the rapidly growing number of adult females who work for pay outside the home, in our society women continue to have nonmarket responsibilities and options not typically assumed by men. Child care and other responsibilities often take women out of the labor force for periods of time. Furthermore, women sometimes are forced to relocate when the needs of their husband's career dictate, resulting in a job change and possibly a period of unemployment or labor market inactivity that is unrelated to their personal economic circumstances.⁶ Because of these considerations, data needs for analyzing women's labor market behavior and assessing women's relative labor market progress are different from those for males.

One example has to do with the lack of continuous labor force activity. For men, it can be presumed that labor force participation is continuous between completing school and retirement, barring disability. It has been fairly well established that job continuity is an important factor in earnings, as it allows acquisition of seniority, on-the-job training, and promotion. Furthermore, there is evidence that job changes are more conducive to advancement when there is no intervening period of labor force inactivity.

Two research issues require information about the continuous work history of individuals. One concerns the assessment of the penalties associated with dropping out of the labor force. That is, how much does a person lose by interrupting labor force activity for nonmarket work? The answer to this question requires comparing the labor market status

Table 2. Characteristics of Households: 1976

Households	Number (thous.)	Percent
Total	72,900	100.0
Husband/wife	47,300	64.9
With children under 18	25,100	34.4
Wife in the labor force . . .	11,200	15.4
Wife not in the labor force	13,900	19.1
Husband only in the labor force	11,400	15.6
No children under 18	22,200	30.6
Wife in the labor force . . .	9,700	13.3
Wife not in the labor force	12,500	17.1
Husband only in the labor force	9,900	13.6
Female-headed (with others) . .	8,000	11.0
Male-headed (with others) . . .	2,500	3.4
Single-person	15,000	20.6
Female	9,600	13.2
Male	5,400	7.4

Note: Categories may not add to totals because of rounding.

Source: Compiled from statistics of the Bureau of the Census and the Bureau of Labor Statistics.

⁶ As women's labor market opportunities improve, it will become less common for family relocation decisions to depend solely on the husband's career objectives. However, studies show that in the recent past, husbands gain on average from a move, while wives experience added joblessness and reduced earnings. See [21].

of individuals who are alike in all respects except for the continuity of their labor force activity or work experience.

Research on the consequences of dropping out of the labor force is important in assessing the amount of sex-based wage discrimination. It is sometimes thought that the main reason women's earnings are less than men's is women's intermittent labor force participation. If the loss in future earnings associated with leaving the labor force could be established, the proportion of the male-female wage differential attributable to intermittency could also be determined. Any residual would have to be due to other factors.

Assuming that the labor market exacts penalties for dropping out, research should also raise questions about the determinants of labor force attachment of women. What factors explain the propensity of some women to drop out and what changes might be expected to keep them in the labor force? For instance, one hypothesis is that higher wages for women will increase the opportunity cost of nonmarket work and increase their labor market attachment. If this is true, as barriers to equal employment opportunity break down, women's labor force attachment will strengthen, and the overall female labor force participation rate will rise, resulting in more rapid aggregate labor force growth.⁷

The results of such research would also have implications for individual firms. Employers express concern about potential high job turnover of women, assuming they will drop out to have children or relocate, according to their husband's career objectives. If women's expected job turnover is high, it would be wasteful to provide on-the-job training for women or to promote them to managerial and supervisory jobs. These attitudes, of course, produce a vicious circle to the extent that they result in relatively low pay for women workers and provide less incentive for women to stay on the job than for men. If it could be shown that women's job turnover could be reduced substantially by higher wages, employers may realize that they can attract stable and permanent women employees into career positions, thus increasing the potential pool of candidates from whom to select their top managers.

The snapshots provided in the Current Population Survey are clearly inadequate for answering questions such as those raised here. Instead, longitudinal data, that is, repeated observations on the same individuals over a period of time, are required. Furthermore, information on noneconomic variables, such as timing and spacing of children, changes in marital status, attitudes toward work, and importance of husband's employment needs in determining family location, to name only a few, all need to be incorporated in a complete analysis of women's labor market behavior and status.

Longitudinal Data

Two types of longitudinal data are presently available. The first combines earnings histories of individuals with information about their personal characteristics obtained from the Current Population Survey. One source of earnings data is the files of the Social Security Administration, which provide continuous employment and earnings histories for individuals. The Internal Revenue Service also has continuous records of individuals' incomes. Neither of these sources has comprehensive data on personal characteristics of the individuals, so that they need to be merged with information from the CPS

to make them of use for a wide range of applications. The merging procedure has, to date, been highly controversial, due principally to confidentiality problems and fears of consolidating Government information about individuals in a central source.

A merge between the CPS and Internal Revenue records was done for 1970. More recently, the 1973 CPS has been merged with Social Security records for that year. However, there have been many delays in making the merged data available and the public-use file was released only a few months ago. Currently, a merge of the 1975 CPS and Social Security records is underway, but Census Bureau officials are uncertain as to when they will be made available for public use.

Recent efforts at merging the CPS with existing longitudinal data files are encouraging, but delays and the rather erratic coverage to date pose difficulties for researchers who need continuity and reliability of access in their data sources. Neither of the merged data files is listed in the Census Bureau publications catalog or in the Census Bureau listing of available data files and special tabulations. Furthermore, conversations with Census Bureau officials suggest that gaining access to the files and using them will be time consuming and frustrating. Certainly, at the moment, they are not readily accessible for widespread research applications. Furthermore, they surely cannot be used by policymakers who require compilations and tabulations to meet immediate, day-to-day needs. At the moment, no formal tabulations are available from the merged data files.

A second important source of longitudinal data that provides detailed information on worker characteristics and attitudes, together with information on their labor market status and work experience, are two special projects that were established in the 1960's for the explicit purpose of monitoring the economic progress of population groups with special labor market problems. One of these projects is the National Longitudinal Surveys; the other, the Michigan Panel Study of Income Dynamics.

The National Longitudinal Surveys. The National Longitudinal Surveys of Work Experience (NLS) were begun in 1966 at Ohio State University under contract from the Employment and Training Administration of the U.S. Department of Labor. The interviews are conducted by the Census Bureau. Four demographic groups are studied: Mature women (30 to 44 years old at the inception of the study), older men (45 to 59 years old), and young men and women (14 to 24 years old). Each sample contains about 5,000 individuals.⁸ These groups were selected because many of the individuals in each cohort are at critical transition stages in their working lives. The young people are recent entrants to the labor force, many of the older women are likely to be returning to the labor force after a period of inactivity, and the older men are in their preretirement years.

Several waves or series of interviews have been conducted with each group since 1966. For instance, the mature women cohort has been interviewed seven times since 1967. Further, the survey for each cohort was designed to obtain information specific to the labor market problems faced by that group. For instance, the survey of older women focuses on problems associated with re-entry into the labor force after children are in school or grown, while for younger women, emphasis is on the transition from school to work and on the effect of

⁷ For a discussion of this possibility, see [26].

⁸ For a complete description of the National Longitudinal Survey and a compilation of the research results, see [41].

isions about marriage and childbearing on labor market behavior.

The NLS has been an extremely useful source of data for analyzing the factors affecting life-cycle transitions of women and for assessing the effects of long-range measures of labor force activity on current status. One illustrative application of NLS data on young women has been to assess the impact of early childbearing on later educational attainment, labor force status, and welfare dependency [15].

Data on the mature women cohort provide some insights into the effect of work experience on current labor market status. It was found, for instance, that women who currently worked full time, year round, and, in addition, worked at least 6 months out of every year since leaving school had a median wage or salary income in 1967 about three-fourths that of comparable men. The median wage or salary income of comparable women who had worked in only half the years since leaving school was only about half that of men. Thus, although there was clearly seen to be a payoff to continuous work experience, these data also show that the large differential in men's and women's wages is not due entirely to differences in work experience. In fact, the study concludes that after adjusting for differences in occupational status, education, and lifetime work experience, the wages of women, on average, are only about 62 percent as high as men [28].

Another valuable aspect of the NLS surveys is that they contain information about attitudes and preferences. These include questions about job satisfaction, attitudes about employment of wives, and perceptions of husband's attitude toward the respondent's working. Between 1967 and 1972, for instance, there was a significant increase in the proportion of women expressing favorable attitudes toward employment among married women with school-age children. There is also evidence that respondents perceived their husbands to be more favorably disposed to their working in 1972 than in 1967 [41]. Unfortunately, the small sample size of the NLS and the limited age groups covered severely restrict the usefulness of the data for universal applications or for making statements about the population as a whole. For instance, it is almost impossible to analyze the behavior of Blacks and other minorities, due to the small number of observations in various categories. Furthermore, the age limitations severely hamper the researcher's ability to draw long-range conclusions. For instance, in the early childbearing study, the oldest women in the final wave of interviews were only 27 years old. Consequently, it was impossible to assess the long-range economic situation of early versus late childbearers. Moreover, the fact that the surveys are conducted only annually and that there is often a delay of several years before the data are available restricts their usefulness for short-run policy analysis.

Currently, plans are underway to interview two new youth cohorts, each consisting of 6,000 young women and men, respectively, between the ages of 14 and 21 years old, with overrepresentation of Blacks, Hispanics, and low-income whites. A new wave of the original cohorts is also in the planning stage. However, these efforts will not surmount the limitations associated with the small sample and limited demographic coverage. Although the NLS has provided a unique and highly valuable source of data for longitudinal analysis of certain cohorts, conclusions drawn can only be applied to the population at large with great hesitation. Merely they can in no way be considered a substitute for the Current Population Survey, which is much more universal

in coverage. Nor are they a substitute for data that could be obtained from merges of the CPS with Social Security and Internal Revenue records.

The Michigan Panel Study of Income Dynamics. The Michigan Panel Study of Income Dynamics is a longitudinal survey that has followed the economic situation of approximately 5,000 families in eight waves since 1968. The study was originally financed by the Office of Economic Opportunity and later by HEW. The sample overrepresents families at the bottom of the income distribution and minority groups and, hence, is a particularly good source of information on the poverty population and individuals with labor market disadvantages.

Because the sample is not limited to particular age groups, the data are suited to a wider range of applications than the NLS. However, because the total sample contains only 5,000 families, some categories contain a very small number of individuals. Like the NLS, the Michigan Panel Survey includes information on attitudes and noneconomic factors that potentially affect labor force behavior.

Because it oversamples the poverty population, some of the major applications of the Panel Survey, to date, have been in studies of welfare recipients, female-headed families, and child support payments.⁹ For instance, it was found that families headed by a female and not on welfare at the beginning of the study were much less likely to go on welfare than families with a male head who left during the course of the study [5].

Because of the small sample size, the Michigan Panel Study has limited applicability to the population as a whole. Furthermore, it contains only annual observations, and there are often years of delay before data are made available. Yet, both the NLS and the Panel Study have attributes that make them uniquely suited for analyzing the labor market status of women. Specifically, they were designed for the express purpose of combining life-cycle information, attitudinal and noneconomic data, information on personal and family characteristics of individuals, and traditional indicators of labor market status (employment, income, occupation, etc.). Merges of the CPS with longitudinal data files that have been collected with some other purpose in mind are more comprehensive in terms of sample size and length of the period covered but do not contain much of the information relevant to analyzing women's labor market behavior and status.

Longitudinal Data From the Current Population Survey. Another potential source of longitudinal data could be obtained by combining successive surveys of the CPS rotational sample into a longitudinal data file. Currently, each household is interviewed in 4 successive months, is out of the sample for 8 months, and then interviewed again for 4 successive months. Thus, if these surveys were matched, responses of a single household at various points in time would be available, providing a truncated longitudinal data base. Furthermore, supplemental surveys, such as the Work Experience Survey, could also be included in the match, providing a more comprehensive set of information on each household than is currently available in the CPS.

Such a match would have the advantage of being available monthly, making it more timely for short-run policy applications and analysis than the existing annual longitudinal surveys. However, households only remain in the survey for 16 months; therefore, the period observed in each household's life cycle

⁹ See, for example, [24].

would be much shorter than for the NLS or merges with Social Security and tax files.

Coordination. Because of the wide range of research applications associated with these longitudinal data sets, continuation and expansion of ongoing projects are highly desirable. Furthermore, there should be a systematic review and evaluation of longitudinal data needs and some coordination of existing efforts.

In undertaking this review, the special needs of the policy community should not be overlooked. To date, the policymaker only has access to the results of longitudinal surveys through research reports prepared for the most part by academicians. Furthermore, the surveys are only conducted annually, and there is frequently a delay in access. The planning exercise that would review longitudinal data needs should also assess the needs of policymakers and consider the publication of a regular document that would summarize, in tabular form, important findings from the longitudinal survey.

DATA NEEDS FOR LABOR MARKET ANALYSIS

The rapid growth of the female labor force and the official commitment to equal employment opportunity for women have given impetus to the search for a better understanding of why women continue to fare so poorly in the labor market. Not surprisingly, a host of explanations has been put forward. Some attribute the problem to a lack of suitable skills and work experience, some to the preferences of women for less demanding work, and some to attitudes of employers and coworkers who think that women should be paid less than men and work in subservient roles.

In order to study differences in labor market status between women and men, several alternative conceptual frameworks have been offered. One view is that the labor market is segmented on the basis of sex so that, for the most part, men and women are noncompeting groups. Women are concentrated in stereotypically female occupations that presuppose a fairly intermittent work force. Hence, these jobs offer little opportunity for advancement and wages and remain low, relative to those in the more hierarchical male occupations. When women do work with men, they are expected to hold subservient positions, and, hence, have less responsibility and earn less than men.¹⁰

Another view is that women and men compete in the same labor market, but that women have certain characteristics that cause employers to give them different (and usually less desirable) job assignments from men. These characteristics include a weaker labor force attachment due to domestic responsibilities, preference for clean and typically feminine work roles, and less (or inferior) prior work experience.¹¹

The policy implications of each of these models are different, but they hinge, to a large extent, on whether the failure of women to move into traditional male strongholds and achieve upward mobility is the result of the inevitable conflicts faced by working women themselves due to domestic responsibilities and a desire to perform work roles that are consistent with societal expectations of femininity. The alternative explanation is that women's lower labor market status results from the discriminatory behavior of employers or coworkers who resist the encroachment of women onto previously male turf.

¹⁰ For an example of this viewpoint, see [3].

¹¹ For an example of this viewpoint, see [17].

Household Data

Most of the available data for analyzing the labor force status of women comes from households. We have a wealth of information about household characteristics and labor force status from the Current Population Survey and some limited information about household attitudes and preferences from the smaller scale longitudinal surveys. These allow us to relate such variables as education and work experience to labor market outcomes for men and women. Based on household data alone, a large "unexplained" residual between men's and women's earnings remains after these factors are accounted for. Further, while nontraditional attitudes held by women have been found to be associated with higher labor force participation and employment in male-dominated occupations, traditional attitudes held by women cannot account entirely for their disproportionate representation in low-paying, female-dominated sectors of the economy.¹²

Establishment Data

Another potential source of information on women's employment and wages would come from employers, rather than households. Employment and wage data from firms are collected by the Bureau of Labor Statistics in its establishment survey. This survey is, according to BLS, "the largest monthly sampling operation in the field of social statistics [36]. In March 1974, it covered 158,400 establishment reporting on 31,637,000 employees (41 percent of the total working in nonagricultural firms). The establishment survey provides current information on wage and salary employment, hours, earnings, and labor turnover in nonagricultural firms, by industry and geographic location.

With the exception of employment, none of the data provided by establishments is broken down by sex. At one time labor turnover data were given by sex, but the breakout was discontinued in the 1960's.

There are a number of reasons why establishment data broken down by sex would be extremely useful. For one thing, there are known reliability problems with household reports of earnings.¹³ Among the reasons for this is that a single family member (often the wife) reports earnings for other family members, and these may not be known with certainty. Some people are also reluctant to report income for fear of being monitored by the Internal Revenue Service. Establishment reports of earnings are generally viewed as more reliable (although the coverage is somewhat different from the household survey). Several studies have compared earnings reported by households, with establishment reports, and there is indeed some discrepancy [14; 38]. However, because establishment data are not available by sex, it is not possible to ascertain whether the reliability of CPS earnings reports varies systematically by sex. There is evidence that CPS reports of unemployment and labor force participation have systematic biases by sex, and, thus, there is reason to expect that this may be the case for earnings reports as well [19].

Because it is generally agreed that the validity and reliability of establishment data on earnings and hours worked are superior to similar data elicited from household interviews, it would be highly desirable to obtain them classified by sex.

¹² For a discussion, see [41].

¹³ These problems are described in [38].

x. The weekly earnings series from the establishment survey, when compared with prices, is widely used as an indication of how workers are faring in a wage-price context, and the extensive sample facilitates comparisons among geographic areas.

There are, however, other reasons for wanting establishment data classified by sex. As mentioned earlier, models that try to account for differences in labor market status between women and men often require data that can only be supplied by firms. Turnover rates, for instance, are said to be higher for women, an allegation sometimes given as an explanation for why women acquire less on-the-job training and have less upward mobility within firms. If turnover rates could be made available by job category, it would be possible to separate the effect of lower female wages (since low wages are generally associated with high turnover) from male-female differences in turnover at the same wage level within job categories.

Another need is for data on part-time employment by industry. Although the establishment survey provides average hours worked, it is not possible to ascertain whether a reduction in average hours is due to a cutback in hours for full-time workers or an increase in the proportion working on part-time schedules. Presently, the only source of data on part-time workers is the Current Population Survey, and the definitions currently used in the CPS are ambiguous and controversial.¹⁴

A final candidate for inclusion in the establishment survey is information on employer attitudes about women. It has been widely accepted that household surveys designed to obtain information about women's labor market behavior should contain questions about attitudes toward work and potential conflicts between domestic responsibilities and labor market participation. Such questions appear not only on private surveys, but on Federal Government data collection instruments, such as the National Longitudinal Surveys.

One possibility would be an experimental supplement to the establishment survey that would cover only a subsample of the firms in the regular monthly survey. This would permit an assessment of firms' attitudes about such things as female-male differences in job attachment, career commitments, and occupational choice, to mention only a few. To date, we have learned a lot both about women's attitudes toward labor force participation and how these attitudes have changed over the last decade. We know these changes have been marked, particularly for mothers of young children. However, we know very little about whether employers' perceptions of women workers have kept pace with the growth of the female labor force. The BLS establishment survey would be an excellent source of such information.

In addition to providing valuable information, requiring sex classification in the establishment survey might serve to heighten awareness on the part of firms regarding the extent of existing inequities. There is evidence of widespread overestimation of the gains that women have actually made since affirmative action guidelines have been promulgated. Then, too, such information would allow firms to measure and assess their own progress in affording equal opportunity to women.

PRACTICAL ISSUES

So far, this paper has focused on conceptual and theoretical issues. However, the researcher or policymaker who uses

¹⁴ For a discussion, see [13].

Federal statistics to evaluate the labor force status of women often encounters practical problems that should be identified. Although the needs of these constituencies are different, the frustrations are often similar.

Access

The researcher or policymaker who wants to gain access to information other than that published in *Employment and Earnings* and *Current Population Reports* faces an uphill battle. It is difficult to find out what information is available. For example, the Census Bureau catalog for 1977 makes no mention of the CPS-Social Security merge file, despite the fact that Census Bureau personnel give assurances that a public-use file is available. Similarly, the Census Bureau contracts work to outside organizations, and often these activities are not publicly announced, nor are the data obtained made available to the general public.

In the past, it has often been assumed that researchers or policymakers with specialized interests will have developed a familiarity with data sources in their area of specialization. However, increased use of economy-wide econometric models, access to computer technology that has rapidly expanded the use of multivariate statistical analysis, and the development of more sophisticated Federal budget planning and measurement techniques have made both the research community and the policy community much more data oriented than ever before. Furthermore, as the increase in the number of women workers has necessitated the use of nontraditional data (not found in *Employment and Earnings* and the *Current Population Reports*), economists have had to become familiar with new data sources.

One step in the direction of improving Federal statistics relating to women is to evaluate access channels and revise catalog publications to improve the availability of statistics already collected.

Duplication

This paper has suggested a number of areas in which Federal data gathering efforts and published tabulations should be modified. However, there are also duplications that could be eliminated. Cost savings by eliminating duplications could at least partly offset the higher costs of obtaining new data and preparing new tabulations.

One example is the duplication provided by tables in the *Employment and Training Report* prepared by the Employment and Training Administration and the *Handbook of Labor Statistics* published by the Bureau of Labor Statistics. The *Handbook* is more comprehensive, but less timely, than the *Report*. Presumably, these two efforts could be integrated.

Other examples of duplication surely exist. These should be reviewed as part of the effort to consolidate information and facilitate access by data users.

Consistency

Inconsistencies in statistical series exist that pose problems for researchers. For instance, CPS data published by the Census Bureau in the *Current Population Reports* include individuals 14 years old and over, while CPS data published by the Bureau of Labor Statistics in *Employment and Earnings* cover individuals 16 years old and over. This incon-

sistency means that the Census Bureau's earnings data are not strictly comparable with the BLS employment data.

Another type of inconsistency occurs when categories differ by sex. For instance, detailed occupational categories are sometimes different for women and men. This makes it impossible to examine relative wages by occupation or the effects of differences in occupational distributions of men and women on their relative earnings.

Special Needs

This paper has focused on a few areas in which a major effort should be made to accommodate Federal statistics to the rapid growth and changing character of the female labor force. There are, however, a multitude of minor problems that could be rectified fairly easily. Some involve the need for tabulations of data currently available only on tape. For instance, median earnings of full-time, year-round workers, classified by age and sex, are not regularly available in tabulated form, despite the fact that differences in age-earnings profiles of men and women are an important factor in the overall male-female earnings differential.

In other cases, the need is for questions to be added to surveys or categories redefined. On the proposed "long form" for the 1980 census, for instance, a single question lumps together data on the respondent's income from unemployment compensation, veterans' payments, pensions, and alimony and child support. Growing concern with the inadequacy of alimony and child support—a situation that has made many families dependent on welfare as a result of marital disruption—means that improved data on this particular income source are urgently needed. Similarly, there is evidence that the average pension income of elderly women is probably less than that of men, but comprehensive data are unavailable. Breaking out the various components of what is now essentially a residual income category would provide much-needed information about these sources of income and open up a policy debate and a wide range of research possibilities.

While this paper has focused on more general issues, the fact is that these seemingly minor details most often make the critical difference in day-to-day research and policy evaluation. As Federal data-collection agencies become sensitized to broad statistical issues relating to women, they should not overlook small changes that would have a great and immediate payoff to the research and policy community.

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COMMENTS

Isabel V. Sawhill

National Commission for Manpower Policy

The word Economy, or Oeconomy, is derived from οἶκος, a house, and νόμος, law, and meant originally only the wise and legitimate government of the house for the common good of the whole family. The meaning of the term was then extended to the government of that great family, the State.

In the family, it is clear, for several reasons which lie in its very nature, that the father ought to command.

There is nothing of all this in political society, in which the chief is so far from having any natural interest in the happiness of the individuals, that it is not uncommon for him to seek his own in their misery.¹

It was in speaking thus that Jean Jacques Rousseau, the intellectual father of the French Revolution and of modern democracy, assumed that the despotism of a male head of family is almost always benevolent, while that of a head of state is usually not. One infers from further reading of the essay from which the above quote is taken that a major difference between the two situations lies in the fact that the citizens of the family are principally women and children, while the citizens of the state are, of course, other men. An interesting footnote on all of this is that Rousseau was supported by a woman for 10 years of his life. In any case, his ideas, as handed down to us over the past two centuries, have had a pervasive influence, although I believe the winds of change are blowing once more, and that the papers prepared for this conference surely represent the dawning of a new age of enlightenment. And, although I say this partly tongue in cheek, there is a sense in which the title of the conference does not adequately capture its significance. It might more appropriately have been called "Federal Statistical Needs Relating to a Changing Society," for, as I read them, these are not a parochial set of papers, and they focus as much on the changing roles of men and children as on the changing roles of women.

Since I agree with almost all of what Nancy Barrett has said in her paper, I have chosen to comment on some more general issues relating to the measurement of income. Income is, of course, the most commonly used measure of economic welfare, although its imperfections in this regard are well known. For present purposes, the most important problems can be classified as follows:

¹ Jean Jacques Rousseau, "A Discourse on Political Economy," in *The Social Contract and Discourse* (New York: E.P. Dutton and Co., 1950), pp. 285-287. Copyright by E.P. Dutton and Co. Reprinted with permission.

- Income does not include the value of time spent in non-market activities. We need to know more about the amount of time devoted to such activities and how to value it.
- Income is usually measured at a single point in time. We need to find better ways of distinguishing between current and permanent or lifetime economic status.
- Income is usually aggregated over individuals who are members of the same household or family. More information is needed about the distribution of welfare within the family and variations in welfare associated with family size and composition.

In each of these three areas, improvements in current concepts and measures would have quite specific implications in helping us to better understand differences in the status of women and men. It is some of these implications which I would like to discuss.

NONMARKET ACTIVITIES

As every student of elementary economics knows, the national income does not include the value of leisure, housework, volunteer work, or other nonmarket activities. Thus, when a man marries his housekeeper or a woman marries hers, for that matter, the value of the GNP automatically falls even if nothing else changes. As the major producers of goods and services outside of the market place, women's status is very much affected by this flaw in our ability to measure the value of these contributions. It is often assumed that because we do not measure nonmarket contributions, we thereby tend to undervalue them, but the opposite interpretation is also possible: As John Kenneth Galbraith has observed we may find it socially convenient to tell people who wash dishes and change diapers that theirs is the highest calling—belief which no one can challenge as long as there is no commonly accepted or objective yardstick to apply. It has been suggested that housewives could find out how much they are worth by hiring themselves out as domestics in one another's households. Although this might improve their status and their financial independence, it would also subject them to all kinds of taxes, as employed women everywhere have already discovered. Thus, while the status and independence associated with having one's own paycheck probably tend to propel women into the paid labor market, even when their real contribution is no greater on the job than at home, the taxes which get deducted from that paycheck have the opposite effect; on balance, it is not clear whether women would work more or less outside of the home if the Census Bureau were to somehow manage to attach a dollar value to the

housewife's services. If, on the other hand, the socially perceived status of the housewife is actually as high or higher than her real contributions warrant, then any attempt to value these contributions, subject them to taxation and to invidious comparisons with wages in other occupations, would release a flood of new entrants into the labor force.

Thus far, attempts to place a price tag on the homemaker's contribution have failed to come up with a conceptually or practically valid standard. It is argued that using the wages paid housekeepers is like using the price of sack cloth to value a fashion designer's creation, and that using a woman's forgone earnings in the market assumes that these can be accurately estimated and applied to measuring productivity within the home. I don't know whether this is an area in which further conceptual and empirical work would prove to be fruitful. However, it seems to me that it would be useful to have, at a minimum, more descriptive information on hours devoted to nonlabor market uses of time. In addition, I think we should explore what could be learned from data on reservation wages—that is, the wage which each nonemployed individual feels would be required as a minimum to accept a paid job.

PAST, PRESENT, AND FUTURE INCOME

The need to rely primarily on cross-sectional census materials has caused us to focus on differences in income between households, but when one begins to follow the same households through time with the newer types of panel data, one finds substantial and previously unsuspected changes in their economic fortunes occurring over time. As a result, we are much more sensitive than in the past to the fact that one year's income is not a good indicator of expected income over lifetime.

However, here again the sex differences are revealing. For men, the best predictor of lifetime income is education and other measures of human capital formation. For women, by contrast, human capital investments are a relatively poor predictor of earnings and, I suspect, an even worse predictor of their permanent family income. As much as some of us might wish it otherwise, what matters most for women is their marital, and not their labor market, status.

Women are particularly hard hit by divorce. Even the reasonably affluent often fall into poverty as the result of marital disruption, a fact which has only recently come to light due to the greater availability of longitudinal data.²

The reason that women tend to experience a relatively sharp drop in economic status following divorce is that they usually retain custody of any children and must bear the full burden of supporting them on their own limited earnings. Studies based on the Panel Study of Income Dynamics indicate that these support responsibilities are not shared, to any great extent, by men. Of those women who are eligible to receive assistance from their children's fathers, about two-thirds have never received such help, and those that do can count on an average of only \$2,000 a year in child support

or alimony [1]. Moreover, in a study which I completed last summer, I estimated that a substantial proportion of current welfare outlays could be eliminated if fathers shared fully in the support of children with whom they no longer live because of a divorce or separation [1]. With some demographers now estimating that almost half of all children will spend some time in a single-parent family in the future, the whole issue of parental support responsibilities is a critical one. Yet, adequate data for studying this important topic do not exist. At the risk of moving beyond what current data will support, but in an attempt to support the need for better data, I would like to hypothesize that inadequate child support by absent parents is a major determinant of poverty and welfare dependency among families headed by women. At present, we do not even have good descriptive data on child support and alimony, much less the capacity to analyze the whole process of inter-household transfers of income.

Perhaps equally important is the need to explore further the lifetime variability of family income with longitudinal data. I believe what we would discover is that these changes in economic circumstances are greater for women than for men, because they are closely related to major demographic events, such as divorce or childbearing, which impact on women more than on men. Such data might even shift attitudes about a married woman's right to subsidized education, training, and employment if it became clear that today's secondary earners are often tomorrow's breadwinners and that, for this reason, current family income is an inadequate measure of lifetime need.

It is, of course, not feasible to conduct a longitudinal survey on a large sample of individuals, but it would be feasible, and almost as useful, to collect more retrospective information on marital status, fertility, and labor force experience, and even on income. It also seems to me that it would be worth examining closely what we have learned from longitudinal studies with an eye to incorporating a few new variables into regular census surveys, where such variables have proved their worth on a smaller scale.

THE INDIVIDUAL VERSUS THE FAMILY

My final set of comments has to do with the appropriateness of measuring income on a family or a household rather than an individual basis. Data on the degree of equality or inequality in the income distribution are usually measured by examining the proportion of households which fall into different income categories. Looked at in this way, there has been little change in the degree of inequality over the post-war period, in spite of numerous efforts to eradicate poverty and improve the lot of the disadvantaged. One apparent reason for the near constancy of measured inequality is that individuals have used some of their increased affluence to purchase more independence—that is, they are living in smaller and smaller families or households. Elderly parents who used to live with their grown children now have their own apartments; teenagers can better afford to establish separate households; and, in general, there are fewer multi-family households and more multihousehold families as Watts and Skidmore point out. As they also argue, this burgeoning array of independent and constantly shifting living arrangements necessitates more attention to the individual as a unit of analysis. This is partly because larger aggregations are too unstable to be analytically tractable and partly be-

²For example, among middle-aged women whose marriages ended between 1967 and 1972, the proportion of families below the poverty level increased from about 10 percent to over 25 percent for Whites and from 44 percent to almost 60 percent for Blacks. See Lois Shaw, "Economic Consequences of Marital Disruption," paper presented at the Secretary of Labor's Invitational Conference on the National Longitudinal Surveys of Mature Women, January 26, 1978.

cause economic welfare depends not only on total income but also on how many people must share it and in what ways. This is not meant to suggest that there are not good reasons for aggregating income across individuals who pool their resources within households or families. But, it might be useful if every adult were asked about (1) the source(s) of their income (if any) and (2) the estimated proportion of their income used to support other individuals.³

As a final comment, I would like to underscore the need to revise the practice of assuming that married households

are always headed by a male. As Nancy Barrett has suggested, this is both symbolically offensive and increasingly inaccurate. More than two centuries ago, the American colonists, taking their cue from Rousseau, complained about taxation without representation. This same democratic ideal has now filtered down from the political to the household economy. Those who have been statistically disenfranchised would like to be counted.

REFERENCE

³In a family unit with complete pooling of resources, this might entail simply aggregating family income and dividing it up into per capita shares. Each adult's contribution would then be their income minus their per capita share of the family's total resources.

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III. Occupation



ON THE USE OF OCCUPATIONAL STATISTICS

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Social and economic policy initiatives on the part of Government are presumably inspired by a collective interest in the well-being of certain identifiable groups in society. While there is no unique measure of the well-being of households or individuals, income seems to be everyone's favorite proxy. Where women and minorities are concerned, Government policy is largely concerned with income derived from labor market earnings. In view of the abundant data available on income and earnings, and the policy importance attached to household incomes, what role can data on occupational affiliation play in the formation of public policy? It is the purpose of this paper to describe the types of data that would be useful for research on the occupational affiliation of women.

INTRODUCTION

Logically prior to a discussion of occupational data needs is some explicit or implicit theoretical framework of the role of occupation in earnings formation. One has to have some idea of what questions to ask before a decision can be made about what types of data ought to be collected and disseminated. At the most fundamental level, we have to decide what constitutes an occupation. There are any number of ways to assign occupational codes and titles. Presumably, the purpose of occupational codes is to convey something about what people do in their jobs. Occupational titles also convey information about wages and socioeconomic status of individuals.

In a study by Welch and MacLennan [20], it was found that 98 percent of the wage variance captured by 298 census occupation titles could be explained by condensation of the titles into nine broad categories. As these authors point out, efficiency dictates that, for a given number of occupational titles, the maximum amount of information be conveyed, or, for a given amount of information, the least number of titles should be used. It is not the purpose of this paper to suggest more appropriate occupational classification schemes; however, I will argue later that, within the current system of occupational titles adopted by the Bureau of the Census, data at the 3-digit level are necessary to study occupational mobility.

Because it is the vehicle by which the returns to human capital investment are realized, occupational affiliation is central to the human capital investment process. Indeed, occupation is a major means by which investment is possible. Apart from mandatory general education, a human capital investment decision is tantamount to selection of an occupational goal. In fact, it is the association of occupations with reasonably well-defined preparatory requirements and earnings opportunities that provides the individual with the information necessary to make investment decisions (occupa-

tional choices). These decisions are conditional upon the individual's preferences, aptitudes, and resources.

CONCEPTUAL FRAMEWORK

A person's earnings capacity can be expressed as the product of his or her embodied human capital times the market rental rate per unit of human capital. Apart from innate ability, embodied human capital is acquired as a result of an investment process undertaken by the individual. In general, the optimal human capital investment to be undertaken each year is determined by the solution to a lifetime utility maximization problem in which one faces various resource and technological constraints. Human capital augmenting investments are usually dichotomized into schooling and postschooling investments. The latter consists largely of on-the-job training (OJT).

In addition to human capital investments that raise earnings by increasing one's stock of human capital, there are investments that increase earnings by raising the market rental rate applicable to one's existing stock of human capital. The most familiar example is that of migration. Presumably, migration (in and of itself) has no effect or, at most, a negligible effect on one's human capital stock; however, one's current stock may be more highly valued elsewhere. Similarly, worker mobility between firms in the same labor market can also be viewed as an investment directed toward moving the services of one's human capital stock to where they are more highly valued. Job search theory is another manifestation of an investment process whereby workers seek the highest remuneration to their existing human capital stock subject to the appropriate resource constraints.

Although for some analytical purposes it may be appropriate to lump all human capital together, in actuality, embodied human capital is not a homogeneous entity. One's embodied human capital can be thought of as a vector of skills, traits, innate abilities, etc. Each element of the vector is associated with a given market rental value per unit of the skill. The vector of market rental values varies across occupations.¹ Thus, different skills and traits in a given occupation are associated with different market rewards. Also, a given

¹ Strictly speaking, the vector of market rental values varies across employers for the same occupational category. The differential rental values represent compensating wage differentials attributable to differing work environments. As a practical matter, it is simply not feasible to deal with occupational subcategories defined at the firm level. Necessity dictates a great deal of occupational aggregation. Even so, the *Dictionary of Occupational Titles* (DOT) lists approximately 20,000 entries.

skill or ability is associated with different market returns across occupations. In this hedonic approach, it is assumed that the market rental rates for various skills are determined by demand and supply conditions separately for each occupation.

In addition to variation in market rental rates, occupations can be characterized by variation in their minimum and maximum skill requirements. Each occupation specifies minimum skill requirements that a prospective worker must satisfy as a necessary condition for employment. Each occupation can also be distinguished by the maximum levels of various skills beyond which no additional pecuniary award is earned. At any point in time, one's potential wage in a particular occupation can be expressed as

$$w_t^0 = \beta_t^{0'} \tilde{K}_t^0 \quad \text{when } K_t^{\min 0} \leq K_t \quad (1)$$

$$= 0 \quad \text{otherwise}$$

where

$\beta_t^{0'}$ is a $1 \times N_k$ vector of market rental rates appropriate to each skill in occupation 0 at time t

\tilde{K}_t^0 is a $N_k \times 1$ vector of an individual's compensable skills in occupation 0

K_t is a $N_k \times 1$ vector of the individual's entire skills

$K_t^{\min 0}$ is a $N_k \times 1$ vector of minimum skills required for employment in occupation 0 at time t

$K_t^{\min 0} \leq K_t$ if and only if $K_{it}^{\min 0} \leq K_{it} \quad \forall i, K_{it}^{\min 0} \in K_t^{\min 0}, K_{it} \in K_t$

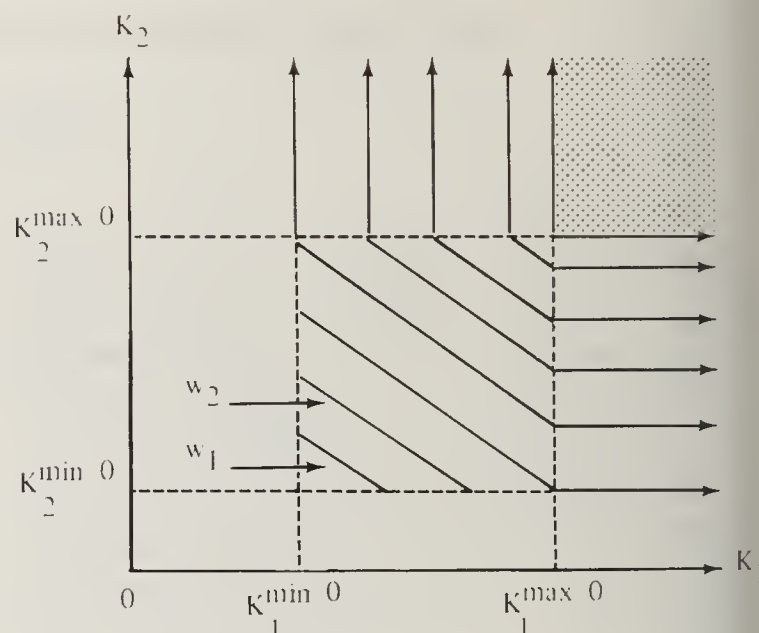
$\tilde{K}_{it}^0 \in \tilde{K}_t^0$ such that

$\tilde{K}_{it}^0 = K_{it}$ for $K_{it}^{\min 0} \leq K_{it} \leq K_{it}^{\max 0}$, where $K_{it}^{\max 0}$ is the maximum level of skill i that is compensable in occupation 0, and $\tilde{K}_{it}^0 = K_{it}^{\max 0}$ for $K_{it} > K_{it}^{\max 0} \quad \forall i$

For some occupations, it may be necessary to modify the notion of maximum compensable levels of skills. For example, in some occupations there may be no theoretical upper limit to the amount of any relevant skill that is rewarded. In practice, however, individuals do not receive infinite wages. Resource constraints put an upper limit on the quantity of skills that can be provided to the market by an individual. One who is in possession of a scarce talent may be highly rewarded in the market, but this is the effect of supply and demand forces on the market rental rates of skills rather than the absence of a maximum compensable level of skills. Thus, it should do no great violence to the facts to assume an upper limit on each skill beyond which additional levels of skill add nothing to the individual's wage.

In order to better illustrate the uses of the framework set out by expression (1), let us consider the simple case of an occupation which utilizes only two skills. For notational convenience, the time subscript is dropped. Each of the wage isoquants (selected from an infinite number of isoquants)

Figure 1



in figure 1 depicts differing combinations of skill levels which yield a given wage at fixed market rental rates, i.e., $dw^0 = 0$. As we move out in a generally northeasterly direction along the wage isoquant map, we encounter isoquants that depict combinations of skill levels representing successively higher wage levels up to some maximum. The lowest wage paid in the occupation is represented by the wage isoquant that consists of the single point $(K_1^{\min 0}, K_2^{\min 0})$. On the other hand, the maximum attainable wage is represented by an isoquant that is actually a region defined by the set S^{\max} :

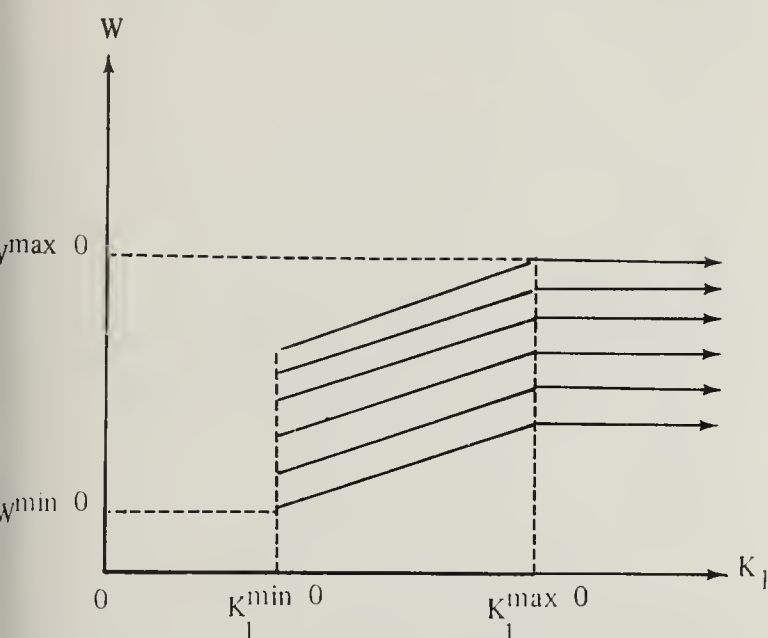
$$S^{\max} = \{ (K_1, K_2) \mid K_1^{\max 0} \leq K_1 \text{ and } K_2^{\max 0} \leq K_2 \} \quad (2)$$

The region is bordered by a Leontief-type relationship whose corner is $(K_1^{\max 0}, K_2^{\max 0})$. Thus, the maximum attainable wage is associated with all pairs of skill levels in which the skill in each category exceeds the maximum skill level for which additional market returns can be earned. In figure 1, the slopes of all wage isoquants intermediate between the minimum and the maximum wage are given by

$$\begin{aligned} dK_2/dK_1 &= -\beta_1^0/\beta_2^0 \text{ for } K_1^{\min 0} < K_1 < K_1^{\max 0} \text{ and } \\ &K_2^{\min 0} < K_2 < K_2^{\max 0} \\ &= 0 \text{ for } K_1^{\max 0} \leq K_1 \text{ and } K_2^{\min 0} < K_2 < K_2^{\max 0} \\ &= \infty \text{ for } K_1^{\min 0} < K_1 < K_1^{\max 0} \text{ and } \\ &K_2^{\max 0} \leq K_2 \end{aligned} \quad (3)$$

Figure 2 depicts the relationship between the potential wage in an occupation and the amount possessed of a particular skill holding constant the level of other skills. Again, it is assumed that there are only two skills involved and that the market rental rates are fixed. Expression (1), evaluated at

Figure 2



$(K_1^{\min 0}, K_2^{\min 0})$ and $(K_1^{\max 0}, K_2^{\max 0})$, corresponds in Figure 2 to $w^{\min 0}$ and $w^{\max 0}$, respectively. The slopes of the wage/skill (K_1) profiles in Figure 2 are given by

$$\begin{aligned} \partial w^0 / \partial K_1 &= \beta_1^0 \text{ for } K_1^{\min 0} < K_1 < K_1^{\max 0} \text{ and } K_2^{\min 0} \leq K_2 \\ &= 0 \text{ for } K_1^{\max 0} \leq K_1 \text{ and } K_2^{\min 0} \leq K_2 \end{aligned} \quad (4)$$

Therefore, for a given value of K_2 greater than or equal to $K_2^{\min 0}$, the wage will rise along a particular wage/skill profile or increases in K_1 above $K_1^{\min 0}$. Also, for a given value of

K_1 greater than or equal to $K_1^{\min 0}$, increases in K_2 between $K_2^{\min 0}$ and $K_2^{\max 0}$ will raise the wage as one moves to successively higher wage/skill profiles.

An interesting application of this framework concerns the differential effects of a legislated minimum wage on various occupations. In the presence of a minimum wage law, the lowest attainable wage in an occupation cannot fall below the legal minimum. In occupations in which the legal minimum wage is binding, minimum skill requirements can simply be raised in order to render the value of a set of minimally required skills equal to the legal minimum wage. Expression (1) can be easily modified to reflect conformance of the minimum skill requirement with legally mandated minimum wages. Increases in the minimum wage can, thus, lead to unemployment of those whose skills no longer satisfy the new standards. Consequently, one can expect the employment effects of minimum wages to vary substantially across occupations. Also, to the extent that the occupational distribution differs between men and women, the effects of the minimum wage may be different for men and women.

Possible unemployment effects can be easily demonstrated with the simple two-skill example previously introduced. Imposition of a legal minimum wage that exceeds an occupational wage when expression (1) is evaluated at $(K_1^{\min 0}, K_2^{\min 0})$ changes the minimum skill requirement of the occupation. The minimum skill requirements would now have to be satisfied by any combination of K_1 and K_2 that lies on the wage isoquant corresponding to the legislated minimum wage. Consequently, all those individuals whose skill bundles fall below the legal minimum wage isoquant are rendered unqualified for employment in the occupation. This outcome is depicted in figures 3 and 4 for the wage isoquant map and the wage/skill profiles, respectively. In figures 3 and 4 w^m denotes the legal minimum wage. The minimum skill requirements are changed by the legal minimum wage from $(K_1^{\min 0}, K_2^{\min 0})$ to

Figure 3

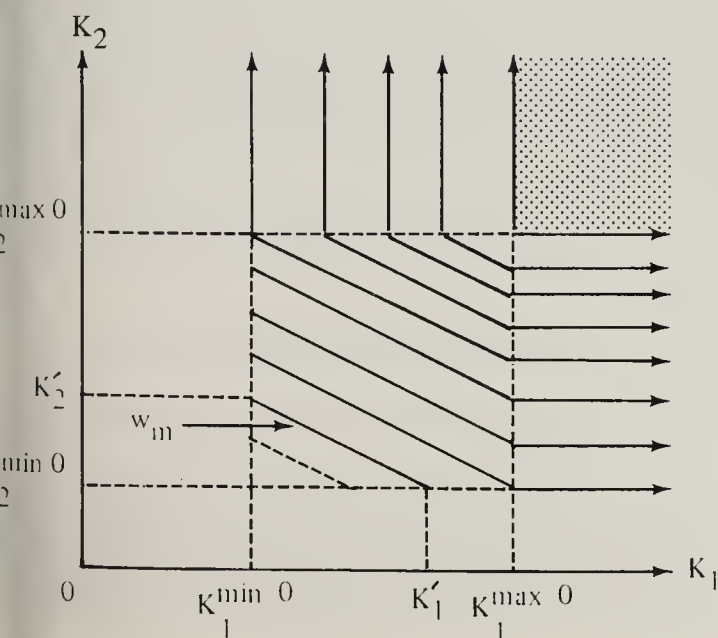
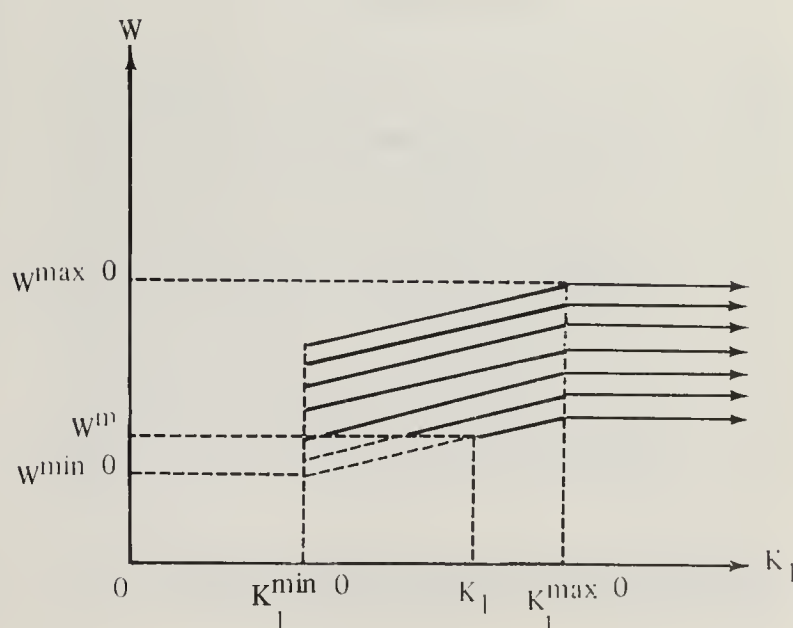


Figure 4



$$S^{\min} = \{(K_1, K_2) | w^m = \beta_1^0 K_1 + \beta_2^0 K_2, K_1^{\min 0} \leq K_1 \text{ and } K_2^{\min 0} \leq K_2\} \quad (5)$$

If $K_2 = K_2^{\min 0}$ then minimum qualifications require $K_1' \leq K_1$ where

$$K_1' = (w^m - \beta_2^0 K_2^{\min 0}) / \beta_1^0 \quad (6')$$

Similarly, if $K_1 = K_1^{\min 0}$, then minimum qualifications require $K_2' \leq K_2$ where

$$K_2' = (w^m - \beta_1^0 K_1^{\min 0}) / \beta_2^0 \quad (6'')$$

Another potential area of application for the conceptual framework introduced in this paper is the secondary labor market of dual labor market theory. Jobs in the secondary labor market are characterized as low paying and relatively insensitive to additional skill and effort on the part of the worker. (See [5; 7].) These jobs are regarded as dead-end jobs, and women and minorities are overrepresented in them. No real social problem is raised by those who are employed in these jobs for only a brief transitory phase of their working lives, e.g., college-student dishwashers. Social issues are raised, however, when women and ethnic minorities exhibit a disproportionately larger share of the permanent attachments to the occupations in which these jobs are mainly clustered. The precise separation between primary and secondary jobs is arbitrary, but it does involve comparisons between occupations of maximum attainable wages and maximum compensable levels of skills.

Within the conceptual framework adopted in this paper, the investment outlay required of an individual to attain any desired wage level in any particular occupation is determined by the production function relationships governing the production of the elements of K_t . The individual combines his or her own time with other inputs to produce various forms of human capital. Each type of human capital is subject to a depreciation rate which can vary over time. The net change in one's vector of human capital characteristics can be described by

$$\Delta K_t = Q_t - D_t K_t \quad (7)$$

where

Q_t is a $N_k \times 1$ vector of gross additions to human capital with a typical element Q_{it}

D_t is an $N_k \times N_k$ matrix of human capital depreciation rates with diagonal elements δ_{it} and 0 values for all off-diagonal elements

K_t is our $N_k \times 1$ vector of human capital characteristics

ΔK_t is a $N_k \times 1$ vector of net changes in human capital whose typical element is ΔK_{it} , where $\Delta K_{it} = Q_{it} - \delta_{it} K_{it}$

² The effects of unions on wages can be analyzed in a similar, though not necessarily identical, manner to minimum wage laws.

It is customary to view formal education as a period of complete specialization in general human capital formation. All of the individual's available time is assumed to be allocated to the production of general skills during this phase of the life cycle. However, it is reasonable to suppose that the degree of generalization diminishes at successively higher levels of education. One's education, if pursued beyond the legal minimum level implied by the various State laws mandating education up to a specified age, becomes increasingly specific to either a single occupation or cluster of occupations. After completion of the formal schooling phase, an individual's investment in human capital largely consists of OJT.

For analytical convenience, it is customary to treat post-schooling investment activity as separable from earning a living. That is to say, one can choose his or her allocation of time between OJT and earnings. The costs of OJT are the foregone earnings plus any direct costs. However, it is not difficult to imagine that some joint production takes place in which human capital formation automatically accompanies production for earnings. In the extreme case in which all postschooling human capital formation is characterized by joint production with earnings, once one opts for a given occupation, his or her wages in the occupation will rise up to some maximum with increases in the skill vector attendant upon the normal work routine. It would not be possible, for a given number of hours engaged in nonmarket time, to raise earnings by devoting more work time to earning and less to OJT.

Once an individual has completed formal schooling, generally the most efficient way to acquire occupation-specific human capital is to be employed in the desired occupation. The case in which one can produce human capital on the job depends on one's abilities and aptitudes as well as occupational-specific technological conditions governing human capital formation on the job. Over a wide age range, we should expect to observe less occupational mobility as one grows older. As a worker's skill mix is increasingly specialized toward maximizing his or her earnings in a particular occupation, the larger the reduction in the wage that would be experienced if the skill vector were evaluated according to the wage structure of any feasible alternative occupation. This wage reduction must be balanced against any future benefits to be derived from occupational mobility. With any positive rate of discount, the present value of the net return from a change in occupation will fall the shorter the remaining period over which returns can be collected. This is reinforced if a worker must divert time away from earning on the new job in order to invest in those skills important in the alternative occupation.

We are now in a position to evaluate discrete changes in a worker's wage rate. The general expression for a wage change is

$$\Delta w_t = \Delta \beta_t' \tilde{K}_{t-1}^0 + \beta_{t-1}^{0'} \Delta \tilde{K}_t + \Delta \beta_t' \Delta \tilde{K}_t \quad (8)$$

where

$\Delta \beta_t'$ is a $1 \times N_k$ vector of changes in market rental rates

$\Delta \tilde{K}_t$ is a $N_k \times 1$ vector of changes in human capital characteristics

Consider first a change in the market rental rates for a given occupation without any change in an individual's human capital. The change in market rental rates could occur in one's current labor market or result from a move to another labor

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market. Under either of these circumstances, we can express the resulting wage change as

$$\Delta w_t^0 = \Delta \beta_t^{0'} \tilde{K}_{t-1}^0 \quad (9)$$

where

$$\begin{aligned} \Delta w_t^0 &= w_t^0 - w_{t-1}^0 \\ \Delta \beta_t^{0'} &= \beta_t^{0'} - \beta_{t-1}^{0'} \end{aligned}$$

If the change in market rental rates is due to a change in occupation, which may or may not involve geographic migration, the terms in (8) have the following interpretation:

$$\begin{aligned} \Delta w_t &= w_t^1 - w_{t-1}^0 \\ \Delta \beta_t^{0'} &= \beta_t^{1'} - \beta_{t-1}^{0'} \\ \Delta \tilde{K}_t &= \tilde{K}_t^1 - \tilde{K}_{t-1}^0 \end{aligned}$$

In the event that the change in occupational affiliation does not involve changes in maximum compensable skill levels, or, if such changes do not affect the individual, $\Delta \tilde{K}_t = 0$ and expression (8) simplifies to

$$\Delta w_t = \Delta \beta_t^{0'} \tilde{K}_{t-1}^0 \quad (10)$$

Finally, we consider the effects of changes in human capital characteristics on the individual's wage in a particular occupation. The change in the wage may now be expressed as

$$\Delta w_t^0 = \beta_{t-1}^{0'} \Delta \tilde{K}_t^0 \quad (11)$$

where

$$\Delta \tilde{K}_t^0 = \tilde{K}_t^0 - \tilde{K}_{t-1}^0$$

Apart from changes in maximum compensable skill levels, the change in the wage will be attributable to the influence of net investment in human capital. For any given human capital component, as long as the gross production of that form of human capital exceeds the amount lost through depreciation, net investment will be positive.³ As long as one has not reached a maximum compensable skill level, positive net investment for any component of human capital will contribute to the individual's wage growth. We would expect that, as one grows older, wage growth would diminish. The effects of depreciation coupled with a finite time horizon over which to collect the returns from further investment yield successively smaller net investments.

In general, the proportionate wage change can be expressed as

$$\Delta w_t / w_{t-1} = \gamma_{t-1}^{0'} \Delta Z_t \quad (12)$$

where

$\gamma_{t-1}^{0'}$ is a $1 \times N_k$ vector whose typical element is

$$\gamma_{it-1}^0 = (\beta_{it-1}^0 \tilde{K}_{it-1}^0) / w_{t-1}^0, \text{ and } \sum_i \gamma_{it-1}^0 = 1$$

³In terms of equation (7), $\Delta K_{it} = Q_{it} - \delta_{it} K_{it} > 0$.

ΔZ_t is a $N_k \times 1$ vector whose typical element is

$$\Delta Z_{it} = (\Delta \beta_{it}^0 / \beta_{it-1}^0) + (\Delta \tilde{K}_{it}^0 / \tilde{K}_{it-1}^0) + (\Delta \beta_{it}^0 / \beta_{it-1}^0) (\Delta \tilde{K}_{it}^0 / \tilde{K}_{it-1}^0)^4$$

Thus, the proportionate wage change is a weighted average of the proportionate changes in market rental rates, human capital characteristics, and the product of proportionate changes in rental rates and human capital. The weights correspond to each human capital component's proportionate contribution to the wage in the base period. Depending on the source of the wage change, some of the proportionate changes in ΔZ_t may be set equal to zero.

From the construction of the proportionate wage change in (12), it is clear that a person's actual wage path and potential wage paths over time are going to be somewhat erratic. This is in contrast to the usual impression of a smooth, concave, wage/experience profile derived from highly simplified models of human capital formation. The reason for this is that we are considering more varied sources of wage changes. Changes in net investment in a homogeneous stock of human capital give way to changes in net investment in a vector of human capital attributes. Furthermore, we are considering changes in market rental rates due to occupational mobility, structural changes in occupations, and to autonomous growth in productivity. Consequently, while the wage path may be concave, it need not turn down after reaching a peak. To take a simple illustrative example, suppose autonomous growth in productivity raises the market rental rates by a constant proportion, i.e., $\Delta \beta_{it}^0 / \beta_{it-1}^0 = g > 0, \forall i$. For an individual in a given occupation, it can be shown that the proportionate wage growth is

$$\Delta w_t^0 / w_{t-1}^0 = g + (1 + g) \gamma_{t-1}^{0'} \Delta \tilde{Z}_t^0$$

where

$\Delta \tilde{Z}_t^0$ is a $N_k \times 1$ vector whose typical element is

$$\Delta \tilde{Z}_{it-1}^0 = \Delta \tilde{K}_{it-1}^0 / \tilde{K}_{it-1}^0$$

Thus, we can say that

$$\Delta w_t^0 / w_{t-1}^0 \geq 0 \text{ as } g / (1 + g) \geq - \gamma_{t-1}^{0'} \Delta \tilde{Z}_t^0$$

Accordingly, one's wage could be maintained even if average net investment were negative so long as autonomous productivity growth were just sufficient to offset the weighted-average of net investments. The proportionate change in the real wage is obtained by subtracting the proportionate change in the price level from each side of equations (12) and (13).

In a labor market characterized by downward money-wage rigidity, occupational mobility may be a means of facilitating downward wage adjustments. Suppose the weighted average net investment rate of a worker were negative and greater in absolute value than the autonomous productivity rate of growth. Such circumstances would indicate a fall in an individual's money wage. In the presence of institutional arrange-

⁴It is assumed that β_{it-1}^0 and $K_{it-1}^0 \neq 0$. In the event that this condition is not satisfied, the base value for the proportionate change can be easily modified to avoid division by zero.

ments which inhibit an employer from lowering the money wage of an employee in his or her current job, various alternatives suggest themselves. First of all, rising demand for the firm's product may allow sufficient growth in the price of the firm's output to bring about the desired reduction in the employee's real wage to the firm. Secondly, an employee could be moved to another job within the firm and, thereby, come under another wage structure. Thirdly, the employee could be forced to quit or be fired. In this instance, the individual may either leave the labor force, which can be viewed as an occupational change, or seek employment in another occupation. If a worker is forced by circumstances to resort to occupational mobility and wishes to avoid frequent changes in employment, he or she would tend to opt for feasible occupational alternatives in which skill depreciation is relatively unimportant. Such would be the case in an occupation in which the important components of human capital depreciate very slowly or in which the maximum compensable skills are well below the individual's current skills. In the latter instance, depreciation of an individual's human capital would have no effect on the wage so long as the person is on the horizontal segments of the wage/skill profiles depicted in figure 2.

Downward money-wage rigidity can be an important factor when firms in a labor market experience a decline in the demand for their output. To the extent that a reduction in market rental rates would have cushioned the employment decline, downward money-wage rigidity will lead to greater employment declines. These employment reductions can entail cutbacks in the work week and/or in personnel. To varying extents, the future wages of those experiencing a reduction in employment will be adversely affected. The reduced work week means less net investment and a layoff can mean negative net investment. Consequently, a worker's human capital is not as great when full employment resumes as it would be if he or she remained fully employed at a temporarily lower wage. Hence, the wage rate after the resumption of full employment is smaller than it would otherwise have been. An individual unemployed or out of the labor force for a lengthy period can experience a considerable amount of skill depreciation.

Casual empiricism suggests that the longer an individual remains unemployed, the lower the probability that he or she will find employment. The idea is that the depreciation of human capital renders an individual less employable. In our framework this means that the probability of finding a job in the vicinity of one's previous wage is lower, especially in one's previous occupation. Also, as an unemployed worker's skills depreciate, the number of jobs in which a worker's vector of skills meet the minimal requirements is reduced. The remaining feasible occupational alternatives may be so unattractive that the unemployed worker leaves the labor force. This scenario is quite applicable to structural unemployment. The policy prescription has been to facilitate geographic and/or occupational mobility. In the case of desired occupational mobility, job training programs are the usual recommendation. Upon completion of job training instruction, immediate placement is imperative, otherwise the worker is likely to find him or herself in the same set of circumstances that prevailed prior to the instructional period.

Thus far, little has been said about occupational earnings as opposed to wage rates. I have assumed a fixed number of annual hours of work so that any change in earnings was solely the result of a change in the hourly wage. A completely general approach would treat lifetime consumption, leisure,

human capital investment, and desired hours of market work as endogenous. The identities describing occupational earnings, absolute change in earnings, and proportionate change in earnings are given below by (14), (15), and (16), respectively.

$$Y_t^0 = w_t^0 h_t \quad (14)$$

$$\Delta Y_t = h_{t-1} \Delta w_t + w_{t-1}^0 \Delta h_t + \Delta w_t \Delta h_t \quad (15)$$

$$\Delta Y_t / Y_{t-1}^0 = \Delta w_t / w_{t-1}^0 + \Delta h_t / h_{t-1} + (\Delta w_t / w_{t-1}^0) (\Delta h_t / h_{t-1}) \quad (16)$$

where

Y_t^0 = annual earnings in occupation 0 in year t

h_t = annual hours worked in year t

ΔY_t = change in earnings

Δh_t = change in hours worked

If, in the latter phase of the work life, individuals value leisure very highly, the reduction in time allocated to OJT may be insufficient to accommodate a rising demand for leisure. The consequence would be that hours of work would fall. (See [9].) If the absolute value of the proportionate reduction in labor supply just equals, and then surpasses, proportionate increments in the wage rate, observed earnings will peak and then decline.

DATA NEEDS

Now that the formal analytic apparatus is set in place, I will proceed to explore issues relating to data needs concerning the occupational affiliation of women. Although neither the vector of market rental rates nor the vector of compensable skills is directly observed, the analytical framework adopted in this paper focuses upon the effects of their mutual interaction on things that can be observed, i.e., occupational wages and occupational distribution. The analysis of the preceding section provides a way of looking at wage changes as the product of occupational mobility, human capital formation, and structural changes which affect the rewards to different skills across occupations. Accordingly, the essential features of the analysis suggest data needs of the following types: Longitudinal wage and employment histories of individual women, an annual time series on the occupational wages and distributions of women workers at a sufficiently disaggregated level, and more local labor market specific data on occupational wages and distributions of women workers. A detailed discussion of these data needs follows.

First, I would observe that concern with the occupational attachment of women is largely motivated by the sizeable earnings gap between the sexes. After adjusting for sex differences in average full-time hours worked, women's median earnings in 1971 were only 66 percent as much as those of men [4]. This implies a sex-earnings differential of 52 percent when using the median earnings of women as the base. According to my own study [13], there is evidence that the gap has actually been widening over a period of at least 20 years.

The average wage for a group of workers at a point in time

can be expressed as a weighted average of the average wages in a completely exhaustive and mutually exclusive set of occupations. The weights are the proportions of workers who are in the various occupations. Thus, we have

$$\bar{w}_t = n'_t \bar{W}_t \quad (17)$$

where

\bar{w}_t is the average wage at time t

n'_t is a row vector of the proportion of workers in each occupation

\bar{W}_t is a column vector of the average wage in each occupation

It is easy to decompose the wage gap between men and women into the male-female difference in occupational distribution and the sex difference in wages within occupation

$$\Delta w_t = \Delta n'_t \bar{w}_{ft} + n'_{ft} \Delta \bar{W}_t + \Delta n'_t \Delta \bar{W}_t \quad (18)$$

where

Δw_t is the male-female wage difference at time t ($\bar{w}_{mt} - \bar{w}_{ft}$)

$\Delta n'_t$ is a row vector of the male-female difference in the proportion of workers in each occupation,

$\Delta \bar{W}_t$ is a column vector of male-female wage differences, by occupation

The first term in (18) indicates how much of the wage difference stems from sex differences in occupational distribution, and the second term indicates how much of the difference is due to sex-wage differences within occupations. The last term in (18) is just a second-order term of differences that arise because of the discrete nature of the wage decomposition.

For any given occupation, the average wage is obtained by evaluating the occupational wage structure at the values of the effective human capital components averaged across individuals comprising the occupation

$$\bar{w}_t^0 = \beta_t^{0'} \tilde{K}_t^0 \quad (19)$$

where

\bar{w}_t^0 is the average wage in occupation 0

\tilde{K}_t^0 is a column vector of the mean values of the effective human capital components

It is clear that the male-female wage difference in each occupation can be expressed in terms of sex differences in human capital components and sex differences in market rental values for human capital. Sex differences in market rental values within the same occupation are clearly discriminatory. One might imagine that one of the human capital characteristics considered by employers is the sex of the worker. This component takes on the value 1 if the worker is male and zero otherwise. Associated with this sex dummy variable is a positive market rental value. This would be sufficient to generate a sex-wage bias. More generally, we might posit a sex bias in the entire vector of market rental values.

Empirically, we could estimate separate wage equations for each sex in each occupational category. The differential reward for characteristics, such as experience or age, could then be estimated. However, sex differences in the estimated coefficients may not be accurate indicators of sex differences in market rental values. This is because a year of experience may represent different skill acquisitions or human capital investments between men and women. Thus, even if a male and a female were of the same age or experience cohort, they could still differ in their vector of human capital components. This difference itself may be attributable to differential opportunities for OJT, but now sex bias is more subtle because of the obvious difficulty in directly measuring human capital.

According to the occupational crowding hypothesis [3], women are confined to a relatively narrow range of occupations which depresses the wages in these occupations for both men and women. In our framework, this means that the market rental rates of human capital are depressed in these occupations. Any observed wage differentials between men and women in these occupations would be mainly the result of differing skill vectors. Many women in the early stages of the working life would have much higher future wages if they were employed in nontraditional, male-dominated occupations. However, as time goes on, opportunities for skill enhancement diminish as women remain in the traditional female occupations. There is also the possibility that certain female occupations are close substitutes for higher paying male occupations. In a variant of the shell game, occupational titles are juggled around in order to mask wage discrimination as occupational differentiation.

Estimation of the contribution of different occupational distributions and wage differences within occupations to the overall sex difference in wages is somewhat arbitrary. The level of occupational aggregation will influence estimates of the relative importance of each of the two sources of the sex difference in wages. As an extreme example, if all workers were lumped together in a single occupational category, none of the sex-wage differences could be attributed to different occupational distributions. At the other extreme, occupational categories could be made to correspond to each job. For some jobs, the minimal skill requirements may include the restriction that all workers be of the same sex. Under such circumstances, perfect job segregation would dispose of wage differentials within occupations as a source of the overall male-female wage differential. Unavoidably, the level of occupational disaggregation used for data collection purposes is the product of compromise.

Changes in the overall male-female wage differences stem from changes in sex differences in occupational distribution and changes in sex-wage differences within occupations. There are any number of ways to summarize these effects over time. One possibility is to adopt the occupational similarity index used by the Council of Economic Advisors [4]. The value of the index at time t (I_t) is computed by

$$I_t = (1/2) \sum_j |\Delta n_{jt}| \quad (20)$$

where

Δn_{jt} is the difference between the fraction of male workers who are employed in the j^{th} occupation and the frac-

tion of female workers who are employed in the j^{th} occupation

The value of the index can range from zero (identical occupational distributions) to one (perfect occupational segregation). It might be useful to discover those macroeconomic factors that can explain movements in the index over time. Unfortunately, the level of occupational disaggregation needed to meaningfully detect changes in occupational similarity is readily available only in census years. Annual data on occupational distribution, by sex, are published only by very broad occupational category. Consequently, occupational movements within broad categories can only be detected in census years. Similarly, earnings data by sex, by occupation, are available on the same basis as occupational distribution data—a great deal of detail in census years but only broad occupational categories in the interim.⁵ In addition to more occupational detail on an annual basis, it would be very helpful to have data on average or median occupational wage rates by sex. Earnings of year-round full-time workers is a proxy for the wage rate, but there still remain sex differences in the average annual hours of work, even among these workers.

While economy-wide occupational data are very useful for assessing general movements in the occupational affiliations of women workers, in and of themselves, they do not provide the information needed to implement effective public policy, nor do they enable individual women to respond to new occupational opportunities. Information needed for individual choices as well as for the operation of programs to assist women in finding new occupational opportunities must be available at the level of the local labor market. The importance of this consideration is easily grasped by viewing the same problem in another context. Does a low unemployment rate for the United States as a whole signify prosperity for Appalachia? Or to put it another way should economy-wide expansionary fiscal and monetary policy be adopted in order to lower the unemployment rate in Appalachia? Efficient resource allocation requires that information be available at the local level.

The monthly Current Population Survey (CPS), conducted by the Bureau of the Census, cannot be used to obtain occupational data at the level of the local labor market. This is, of course, because the sample size is only large enough to achieve statistical reliability for nationwide aggregates. Fortunately, detailed occupational data are available at the local labor market level for census years. From census data, one can compute detailed occupational distributions across detailed industry categories. These fractions have been incorporated into an industrial-occupational (I-O) employment matrix by the Bureau of Labor Statistics (BLS) for the United States as a whole. The I-O matrix is defined over 200 industries and 400 occupations. Many State departments of employment security, in cooperation with the BLS, have developed similar matrices on a statewide basis and, in some instances, at the local labor market level.

Forecasts of occupational employment are obtained by applying the I-O matrix to industry employment forecasts obtained from econometric models of the national, State, and local economies. At the present time, there is no classifi-

cation by sex. Thus, while overall occupational employment can be forecast in a given area, there is no current effort to obtain these forecasts separately by sex. If the occupational-industry employment distribution from the census were differentiated by sex, the potential number of entries in the I-O matrix would double from 80,000 entries to 160,000. Naturally, there would be many null entries for local areas. And, in any event, the availability of computer information retrieval systems makes the task a manageable one.

Unfortunately, a problem still remains even if occupational forecasts can be obtained for women at both the national and local levels. The occupational distributions that existed at the time of the census are incorporated into future forecasts. Strictly speaking, distributional trends cannot be picked up, let alone seasonal and cyclical movements in occupational distributions. At the present time, some of the States, in cooperation with BLS, update their I-O matrices once during the intercensus period to incorporate perceived trends in the occupational distribution. More frequent updating of the I-O matrix is necessary to improve the accuracy of occupational forecasts, as well as to provide researchers with the data needed to understand the process underlying staffing patterns in industry. Obviously, a complete national census cannot be conducted any more frequently than every 10 years. Nevertheless, State offices of employment security can and do survey local employers to obtain current information on employment by occupation.

There continues to exist an important need for research on occupational choice and occupational mobility among women. The economist's systematic treatment of occupational choice goes at least as far back as Adam Smith, with refinements continually being made. In recent years, there have been studies which examine the link between expected lifetime labor force participation and the occupational affiliation of women [15; 16; 21]. According to Zellner, those occupations which involve only modest wage-growth possibilities but relatively high wages for low experience levels would tend to be more attractive to individuals who anticipate relatively little labor force participation over the lifetime. Occupations which offer ample opportunities for wage growth but which offer relatively low wage possibilities for low experience levels tend to pay off for those contemplating full-time labor force participation over the working life. According to Polachek, those who anticipate intermittent labor force participation would tend to be attracted to occupations in which skill depreciation is relatively unimportant. In the absence of exceptionally strong nonpecuniary rewards, it simply does not pay to invest in skills which rapidly depreciate during prolonged absences from the labor force if one expects to spend lengthy or frequent spells out of the labor force.

While the above approaches attempt to explain the occupational affiliations of women on the basis of lower expected lifetime labor supply and intermittent labor force participation, they are not meant to imply that discrimination has nothing to do with the occupational choices of women. Labor force participation and occupational choices are the results of constrained utility maximization. Where women are concerned, labor market discrimination or the anticipation of discrimination obviously influences the constraints. In order to better understand the determinants of occupational choice and occupational mobility, we require longitudinal data at the household level. The National Longitudinal Survey of mature women is an example of the type of survey data that is needed.

⁵For empirical evidence on the roles of occupational distribution and sex differentials within occupations in the overall male/female wage differential, see [13].

Since theories of human capital formation and occupational mobility are based on life cycle models, it is imperative that socioeconomic data on women over their working lives be made available for research.

CONCLUDING REMARKS

In order to ask the right questions about the occupational affiliation of women, it is necessary to have some sort of theoretical frame of reference. Very little is known about the technological conditions governing the formation of skills on the job, and much more needs to be known about occupational choice and mobility. As a small step toward asking the right questions, a simple framework has been presented which links together occupational affiliation, human capital formation, and wage rates. It affords a means of discussing both theoretical and empirical issues that relate to the occupational attachments of women.

Data limitations can be found at both the macroeconomic and microeconomic levels of analysis. For the purposes of

understanding and predicting changes in occupational distribution among women, annual data on detailed occupational distributions must be made available. Similarly, detailed occupational data should be made available on a more frequent basis for local labor markets. Public policy aimed at enhancing the occupational opportunities for women cannot be made fully operational merely on the basis of economy-wide statistics, nor can individuals really respond effectively to information on U.S.-wide averages. Finally, comprehension of how individuals choose occupations and subsequently form marketable skills depends upon the availability of longitudinal data on individual households.

Although many individuals may not directly consult official statistics in deciding upon human capital investments, they do form perceptions of occupational opportunities from a variety of sources which include information disseminated by public agencies. The purpose of the statistics is to facilitate resource allocation by making information available to the public and policymakers and to enable researchers to better understand the process of occupational choice and earnings generation.

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COMMENTS

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In gathering today to discuss possible changes in the census occupational statistics, we join a long and distinguished line of predecessors. For the tradition of reviewing and adjusting the decennial census arose with its inception. To set the historical stage for our analysis of occupational statistics as they apply to women, let me begin with a quotation:

Interest in the subject to women's position in the economic world, and particularly in her position as a producer, is so universal that all details of that relationship take on a considerable importance. But curiosity concerning the fact is satisfied only with great difficulty both because there is a dearth of material, and because of the unorganized form in which data as exist are to be found, and the heterogeneous character of the sources from which they must be drawn [1, p. 14].

More than 70 years have passed since these criticisms were made. Yet, the issues we shall raise today are not very different from the ones disturbing Abbott and Breckenridge. In the years since 1906, numerous changes have been made in the occupational census [24]. Most recently, the 297 3-digit census occupation categories used in 1960 were expanded to 441 in 1970 in order to try to reduce the large number of workers who, in 1960, ended up in the "n.e.c." (not elsewhere classified) categories within the major occupational groups. Many job titles were shifted about to increase homogeneity among specific categories.¹ Some of the added job titles reflected the growth of new, technologically innovative occupations, such as computer related jobs. In one occupational group of great importance to women, "clerical and kindred workers," the expansion of 3-digit categories from 28 in 1960 to 48 in 1970 was a response to the occupation's growth, technological change, and increased specialization of function within the group [27]. Since the 1970 census, the Census Bureau has moved to eliminate sex stereotyping in the occupational titles [20]. One hopes that the references to employee as "he" will also be eliminated in the 1980 questionnaire.

What other revisions should be made for the 1980's? Clearly, before making any new recommendations, we must step back and deal with the more fundamental issue: What kinds of questions do we want the data to answer? Oaxaca's paper provides one response to this query. He focuses on the relationship between occupation, skill formation, and earnings and argues persuasively that occupational data are important

in order to more fully understand the relationship between earnings and human capital accumulation. But, there are a multitude of other questions most social scientists and the general public want to be able to answer by examining occupational data.

QUESTIONS TO BE ANSWERED WITH OCCUPATIONAL DATA

In my view, we want occupational data by sex for three purposes, their relative importance not necessarily being reflected by the order in which they are discussed.

First, most people want occupational data for report-card purposes; they want to compare the distribution of women and men across occupations in order to determine if women have made progress, vis-a-vis men, where progress is measured along a variety of dimensions, including, among others, income, status, and power. This is the purpose Abbott and Breckenridge had in mind when they indicated they were interested in women's position in the economic world.

The second major use of the data is to test theories. Social scientists wish to ask whether the data provided by Government statistics confirm the relationships posited by particular theories and to what extent existing theories are successful in explaining women's position in the labor force. The use of occupational data to test aspects of the human capital theory was the topic Oaxaca explored in his paper.

Finally, social scientists, educational planners, and the general public are interested in using occupational statistics for planning purposes, to predict which occupations are likely to require expansion or contraction in the future. Such predictions, we expect, will be useful to individuals in making occupational choices and to educational planners in deciding what types of training to provide.

These, then, are the three major uses to which we wish to put occupational statistics: Reporting progress, testing theory, and making forecasts. To what extent are the current data useful for these purposes? And what types of improvements would more adequately meet these three needs? We begin with the report-card function of the data.

I wish to thank Kathryn Poss for excellent research assistance and members of the Education and Work Seminar at the Stanford School of Education, especially Michael Imber, Henry Levin, Russell Rumberger, Joan Talbert, and David Tyack, for helpful discussion of this topic.

¹ See [15]. For a discussion of some of the main concerns in revising the 1960 occupational system, see papers by Hodge and Siegel; Greene; Lewis; and Cain, Hansen, and Weisbrod in [3].

EXAMINING PROGRESS: THE REPORT-CARD FUNCTION

While there are very few who would argue that men and women should be distributed across occupations in precisely the same proportions, most agree that the current distribution reflects the unnecessary and undesirable interference of sex-role stereotyping in men's and women's occupational choices and in employers' hiring decisions. These stereotypes, which intervene on both the supply and demand sides of the market, not only reduce overall productivity but also cause inequities, by sex, in income, decisionmaking power and job autonomy. Thus, we test for diminution in occupational segregation, not because we believe that such diminution is desirable for its own sake, but because we expect that a lessening of occupational segregation would be likely to result in improvements in resource utilization and a more equitable distribution of income, power, and autonomy between the sexes.² In my view, however, the current data on occupations, by sex, are not entirely satisfactory for measuring progress in either resource utilization or sex equity along the dimensions mentioned.

First, it must be remembered that the occupational data we have are obtained from individuals who classify themselves into occupations. While difficulties stemming from this procedure may be smaller than those in, for example, some Latin American countries, where individuals tend to classify themselves by their academic degree regardless of their current job, there are, nonetheless, problems inherent in having Americans classify their own occupations. For example, social scientists have noticed the decrease in the proportion of Black women domestics and the increase in their employment in service occupations. It may well be that the statistics overstate this trend. It seems likely that some women who work both as domestics and as service workers in hotels may report themselves as being in the higher status service occupation, even if they work primarily as domestics. Similarly, the boundary line between high-level clerical occupations and low-level administrative occupations is quite porous. How much of the increase in women managers represents merely an increased propensity for clerical workers to classify themselves as administrators? Clearly, any system of classification of occupations is arbitrary and employers may also sometimes have incentives to shade their responses to questions about employees' occupational classification, as, for example, on EEOC forms. However, it would seem particularly useful for the Census Bureau to increase its efforts to study the comparability of individual and employer occupational classification and then to make such studies available.

The second major problem in using the census data to measure progress stems from the fact that, while these data provide information on the characteristics of job holders by occupation, they do not provide information, with the exception of an industry designation, on the characteristics of the occupation itself. Abbott and Breckenridge noted this in 1906: "... the census of so-called occupations is not a census of occupations, as such, but of occupational groups. . . . From

it we can learn how many, who, in connection with what general industries, but not what" [1, p. 40].

The *Dictionary of Occupational Titles (DOT)* does, indeed, contain information on some occupational characteristics, but the *DOT* classification system has been different from that used by the Census Bureau. Thus, researchers interested in the utilization of skills and/or training or wishing to test whether recent changes in women's occupational attainment have resulted in a closer fit between women's training and their use of that training in their jobs have been seriously hampered. In the Fall of 1977, however, the U.S. Department of Commerce issued the *Standard Occupational Classification Manual* [28]. Combining census data on the sex composition of occupations with *DOT* data on job content should be possible for the 1980 census.

With respect to measuring changes in income equity, by occupation for men and women, the census data are also deficient. Table 4 of the 1970 Subject Report *Occupation by Industry* provides us with information for both sexes, separately, on the mean earnings in 1969 of employed persons with earnings in 1969 according to industry, by occupation. However, since there is considerable variation, by sex, in the number of hours of employment, it is difficult to use these data to measure progress toward income equity within an occupation. Average annual wage rates by sex, by occupation, are required, and the standard deviations associated with the average rates should also be made available.

The problem of measuring progress toward equity in decisionmaking power or job autonomy is even more difficult. For example, suppose we find, as indeed we do, that the proportion of managers who are women is increasing. The usual interpretation of this finding is that decisionmaking power and job autonomy are becoming more equitably distributed between the sexes. But, such conclusions are hardly warranted.

At the 2-digit level of information (the level at which our annual data are presented and the level at which EEOC data are collected), an increase in the proportion of managers who are women says virtually nothing about the redistribution of decisionmaking power or job autonomy. The components of the 2-digit category "managers and administrators, except farm" are too dissimilar to reach conclusions about these matters. College presidents, corporate officers, and cabinet officials are all managers and administrators, as are funeral directors, office managers, superintendents and elementary school principals.

Even at the 3-digit level, it is difficult to draw firm conclusions about decisionmaking power or job autonomy. For example, the manager of a chain store or franchise operation generally has much less decisionmaking power than the manager of an independent store. Yet, both are included under census code 231, "sales managers and department heads, retail trade." And those of us in academia are all familiar with the substantial diversity within the census category 235, "school administrators, college." Suppose, by way of illustration, that, in these times of budget stringency, a retiring associate dean (male) is replaced by an administrative assistant (female). The statistics would indicate that the percentage of women college administrators had increased. Yet, it would certainly not be the case that the decisionmaking power (or, indeed, the status or income) formerly accruing to men had now been redistributed to women.

The solution to this problem cannot, in my judgment, be

² Although Oaxaca and others stress the connection between occupation and income, it seems to me that, to most social scientists and certainly to the general public, issues of equity in prestige, decisionmaking power, and job autonomy are also important. I omit the matter of prestige from the discussion because of the dispute within the sociological literature about whether or not there are sex differences in prestige among employed persons. See [14; 26].

met through the usual census publications. What is required to measure progress in the redistribution of decisionmaking power between the sexes is a series of carefully executed case studies which directly examine this matter in instances where women have moved into formerly male positions.

TESTING OF THEORY

We turn now to the use of occupational statistics to test theory. Oaxaca has given us a useful discussion of the way in which occupational data can be used to test several aspects of human capital theory. His observation that investment in specific human capital is tantamount to making an occupational choice provides a nice link between the discussion here and the way in which human capital theory is usually framed. His model also provides us with some specific testable relationships between earnings, human capital accumulation, and occupation. In Oaxaca's view, testing of his model would require only two relatively modest changes in the occupational data now provided: The publication of average annual wage rates by sex, by occupation, and the publication, on an annual basis, of 3-digit occupational information by sex.

However, the human capital theory is no longer the only one in town. Moreover, there are some aspects of human capital theory testing that Oaxaca has ignored.

There are currently several different theories which seek to explain the female/male wage differential. Although earlier work on this topic, by Fawcett and Edgeworth, highlighted the connection between sex differences in pay and sex differences in occupation, with the exception of Bergmann, modern neoclassical theoreticians have not emphasized the role of occupational segregation in determining the F/M pay differential [6; 7; 12; 13]. Rather, neoclassical explanations of the sex-salary differential have stressed, on the demand side, either the taste for discrimination (women are paid less than men in order to compensate employers for the disutility of hiring women) or statistical discrimination (women are paid less than men to compensate risk averse employers for the less reliable information which is available about women employees). On the supply side, neoclassicists have relied on the human capital construct (sex differences in pay reflect sex differences in human capital) [2; 4; 5; 17; 19; 25].

Segmented labor market (SLM) theorists, on the other hand, have, as their appellation suggests, made the relationship between occupational segregation and pay differentials a central focus of their work [8; 11; 21]. The two key elements of their approach are as follows. First, either to enhance efficiency, or, in the more radical versions, to achieve social control, employers find it useful to segment the work force so that men and women are assigned to mutually exclusive job ladders. Second, the job evaluation process within internal labor markets assigns higher wages or salaries to those job clusters reserved for males. While persisting pay differentials, by sex, are an anomaly for the neoclassical model, in the SLM theory, they are a fully expected outcome.

The need for information on job content in order to test SLM theories is clear. For whether the theories divide occupations into two, three or four segments, they are basically trying to distinguish "good" from "bad" jobs and to relate this distinction to differences in earnings. Several studies have used the *DOT* to try to distinguish so-called primary and secondary jobs.³ It would also be useful to compare the

quality of working conditions of female-typed and male-typed jobs. Again the ability to translate easily between the *DOT* and census categories is critical. In addition, since one of the most important determinants of a "good" job is its potential for increasing earnings with experience, testing SLM theories would be greatly aided if, for each 3-digit occupation, we had information not only on the average wage rate but also on the average wage rate of employees with low, medium, and high levels of experience. Such observations would supply a far more accurate picture of the relative desirability of particular occupations than we can obtain at present.

A second issue dealt with by SLM theories is the stability of occupational segregation. The 1/1000 sample of the 1970 census asked not only the respondent's present occupation but also his or her 1965 occupation. This information has permitted some interesting observations to be made on the mobility out of secondary jobs for various groups [9]. It is hoped that the 1980 census will continue to ask about the occupational history of respondents in the 1/1000 sample.

Occupational history of a different sort would be particularly useful in testing the human capital theory proposition that women earn less than men because they pay a penalty for discontinuous labor force participation. This hypothesis has been tested using the smaller samples from the National Longitudinal Survey and the University of Michigan Panel of Income Dynamics [10; 16; 17; 18; 23]. If a question on past labor force behavior were asked in the 1/1000 census sample, it is likely that the penalty hypothesis might be more definitively investigated.

FORECASTING

The final purpose of census occupational data that we will consider is forecasting. Here, I can only agree with Oaxaca that more research is required on the determinants of initial occupational choice by young men and women and changes in those choices over the life cycle. In particular, it would be interesting to trace the extent to which young people obtain and use census information on occupations and income, as well as census forecasts on future occupational needs. It would also be interesting to monitor the relationship between changes in the sex composition of occupations and the job choices made by young people.

I also agree with Oaxaca that forecasts of future occupational requirements need to be made at the local level. Since educational planning and retraining of unemployed workers are carried out by States and/or counties, occupational forecasts must correspond to the need for information at those levels. I am not clear, however, why Oaxaca thinks that occupational employment should be forecast by sex. I would prefer to see forecasts made in terms of need for manpower, with the assumption that the job openings could be trained for and obtained by individuals of either sex.

CONCLUSION

Let me conclude with two points. First, it is clear that several of the problems I have discussed concerning occupational statistics are relevant to all of the purposes I have outlined. However, I have specifically sought, in my comments, to emphasize that census occupational information is desired for many purposes; for only by keeping these several purposes firmly in mind can suggestions for altering census

³ For example, see [9; 22].

categories be evaluated. For example, Oaxaca cites a study by Welch and MacLennan which suggests that the detailed census occupational titles ought to be abandoned in favor of a classification scheme using only nine categories [29]. This proposal is defended by the authors on the grounds that these nine categories capture 98 percent of the wage variance in male wages. Not only does this proposal totally ignore the issue of sex differences in occupations, it also fails to recognize the forecasting function of occupational statistics and the fact that theory testing involves more than simply testing the relationship between occupation and income. Proposals for altering census occupational categories need to be evaluated con-

cerning their effects on all three of the functions outlined.

Second, I wish to support Oaxaca's suggestion that 3-digit level occupational information, by sex, be published annually. Clearly 3-digit level statistics are required for forecasting. Moreover, while I have indicated that frequently occupational data are used to make unwarranted claims (especially concerning progress for women vis a vis men), I prefer to have journalists and others reach conclusions based on the more accurate 3-digit statistics than on the 2-digit level numbers currently being published. As I have tried to suggest, changes in the sex composition of 2-digit categories can be extremely misleading.

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RESPONSE TO DISCUSSANT'S COMMENTS

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My discussant, Myra Strober, suggests that forecasts of local labor market occupational employment should not be made separately for men and women workers. Her concern is motivated by the possibility that the results of these forecasts could be mistakenly construed as evidence that women do not seek employment outside the traditionally female occupations. I do not deny that some may be tempted to make this inference. However, people can, and do occasionally, attempt to make this inference on the basis of currently available statistics. Yet, this does not prevent us from making the data available.

It must be understood that forecasts indicate some likely state of events that will occur in the future if things continue

as they have in the recent past. In the context of separate occupational employment forecasts for men and women, a forecast of occupational distributions that are viewed as undesirable should put into motion various policies aimed at facilitating the opening up of nontraditional occupations to women. This should provide an attractive alternative to the current practice of passively examining past data to discern the effects of past policies. The only individuals who might lose by an active policy of attempting to head off dire predictions of occupational distributions would be the forecasters themselves, whose forecasts would be rendered inaccurate to the extent that policy intervention is successful.



***IV.
Discrimination***



DATA NEEDS RELATING TO FIGHTING EMPLOYMENT DISCRIMINATION AGAINST WOMEN

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Among those social scientists who have tried to follow trends in the labor market position of minorities and women in the United States, it is probably fair to say that there is a consensus that although some progress has been made over the last decade, a great deal more needs to be done. We have not yet brought a fair share of qualified minority people and women into jobs from which they have been traditionally excluded, and we have not yet made fair hiring, promotion, and pay the norm rather than the exception. It would not be correct to say that lack of adequate data has been a chief cause of the slow progress we have experienced. However, the collection and dissemination of relevant data by the Government are of substantial importance in the continuing attempt to reduce discrimination, and an improved program of providing useful information might well make a considerable contribution toward a more efficient and more vigorous enforcement effort.

Data which bear on issues relating to employment discrimination are important in two contexts: One set of data is useful in setting national attitudes and policies, and another (overlapping) data set is needed for dealing with situations of individual employers and particular groups of their employees. In this paper, the first part deals with the adequacy and availability of the kinds of data needed for the direction of national policy and the second part, with data needs for use in connection with individual work establishments.

DATA NEEDS IN SETTING NATIONAL POLICY ON DISCRIMINATION

Probably the most important use of economic data relating to discrimination is their direct use in public discussions of the situation of groups which have been targets of discrimination, to motivate ameliorative policies on their behalf. Data which are used as ingredients to research may also end up having a policy influence, depending on the relevance of the research and the researcher's flair for exposition.

The kinds of information (classified by race and sex) of most importance for direct use in public policy discussion and in research relating to discrimination are—

1. Distribution of employment by occupation
2. Unemployment rates
3. Wage rates or wage income
4. Characteristics of individuals, by group (such as education, measures of labor market attachment, and experience), which must be accounted for before a verdict

on the extent of employer discrimination can be drawn up

5. Labor turnover statistics (separations, accessions, and promotions) which provide information on opportunities for personnel movement (which may tend to be administered by employers in a discriminatory or non-discriminatory way)

The first three items constitute the prime indexes of a group's success or failure in the labor market. They, plus the next two, are also major ingredients to research on the labor market problems of discriminated-against groups. In the United States, concern for the position of Blacks in the labor market has been largely fueled by monthly releases of unemployment rates. Annual income surveys, which have been used as proxies in the absence of good wage-rate data, have also played a part. With respect to women, it is probably the income survey results and the data on occupational distribution by sex which have had the most influence in arousing women to their situation and educating the public to their labor market problems.

Having delineated the major kinds of information which are needed to the context of the debate and decisionmaking over national policies, it is appropriate to ask—

- How often should each kind of data be made available?
- What industries and occupations should be broken out?
- What geographic areas should be distinguished?
- How well do published data cover the needs?
- What are some of the other problems with published data?

The answers to these questions depend on an assessment of the balance of costs and benefits and are not going to be the same in all times and places.

Occupational Breakdowns in Macrodata

Data on sex differences in the distribution of employed persons by current occupation are central to all discussions of discrimination. While some employers discriminate by denying equal pay for equal work, the most common form of

Some of the material in this paper draws on a review by the author being prepared for the National Commission on Employment and Unemployment Statistics.

discrimination is an unwillingness to hire or promote women into types of jobs from which they have traditionally been absent. Disparities by sex in unemployment rates and wage incomes follow from the practice of discrimination in hiring and promotion, but the primary practices themselves are most clearly revealed in the occupational data.

Women in the United States tend to be excluded from jobs which have a supervisory or management component, or from which supervisors are chosen. They also tend to be excluded from jobs in which there is a significant and lasting component of learning-by-doing. Published occupational breakdowns should make these exclusions clear and also to make it possible to chart progress in breaking down exclusionary practices. The present 31-occupation breakdown, by sex and age, shown monthly in *Employment and Earnings* is excellent. It would be very desirable if this were published on a race by sex by age basis. (See table A-21 from *Employment and Earnings*, reproduced on p. 45.)

Industry Breakdowns of Employment Data

In the past, the employment of women by a particular industry depended largely on the distribution of the industry's jobs by occupation. The measure of an industry's progress is not how many women it employs, but how many it has hired for nontraditional jobs. Thus, the industry data most valuable for policy purposes would be data available on an occupation by industry by race by sex basis. The currently published breakdown giving occupation by industry monthly (table A-24 of *Employment and Earnings*) for all workers would be valuable if broken down monthly by race by sex by occupation by industry.

When the enforcement agencies focus on a particular industry's (for a particular firm's) employment practices, it frequently makes sense to organize the employment data for that industry in a way which relate to the particularities of that industry. (This is discussed below.) However, there are times when data organized for enforcement purposes become (or can be made) highly relevant to public policy discussions on the problem of discrimination—its forms, its consequences, and the potential remedies. Data of these kinds sometimes have an immediacy which aggregate monthly time series lack. Relatively minor use has been made of such data for policy purposes, and most writers on policy issues, including economists specializing in research in the area of discrimination, seem oblivious to its potential. (See the recent deposition (under oath) by a highly respected researcher specializing in the economic careers of women workers in which he argued that females have had an equal opportunity with males to be employed in all jobs.¹) The organized publication of the data made available and put into the public domain as a result of court or regulatory proceedings (as in the Liberty Mutual case or the AT&T case) would be highly desirable.

Data on Wages or Income and on Earners' Characteristics

Information by race and sex on basic hourly wage rates paid, although it would clearly be useful in many research contexts (including, but certainly not limited to, studies of discrimination), is most notable by its absence in the United

States. Only the Area Wage Surveys of the Bureau of Labor Statistics offer actual wage rates, and these are only for a scattering of particular occupations. These data are available by sex but not by race for local labor markets and are obtained from employers. The surveys provide no information on worker characteristics beyond sex. It is perhaps ironic that an astute observer of labor markets believes that the publication of such data actually encourages and aids in employer wage discrimination by sex, since employers allegedly use them in deciding what wages to offer [2]. The U.S. Department of Labor should perhaps consider the truth to this assertion, and consider discontinuing their publication. They have been little used in research.²

The major source of U.S. Government data on wage payments used extensively in research on race and sex bias has been data deriving from the *Current Population Reports*, which give wage income. These data are available annually in published form (Series P-60), and tapes are made available to researchers, which give data on individuals, so that it is possible to relate an individual's wage income to his or her hours, occupation, industry, education, age, family status, etc. Similar information has been provided by the Survey of Economic Opportunity.

The surveys of the National Longitudinal Survey provide wage data and are particularly rich in variables relating to the characteristics of the earners and include information on work history, attitudes, numbers and ages of children, and a host of other topics. They also provide data on individuals at different points in time. Another source of these kinds of data is the surveys done by the Survey Research Center at the University of Michigan.

Geographic Breakdowns in Macrodata

For purposes of national policy against discrimination, geographic breakdowns of unemployment statistics by race and sex are important where there are suspected to be significant differences in the degree of discrimination by region. In the case of sex discrimination, it is not unlikely that such regional differences would develop, although they do not seem of importance now. Since 1970, State and metropolitan area breakdowns of employment and unemployment by sex by major occupation and by race by occupation have been available annually in the BLS publication, *Geographic Profile of Employment and Unemployment*. It would be an improvement if the data could be published on a race by sex by occupation basis.

The antidiscrimination agencies which use geographic differences to allocate resources among regional offices can presumably rely, to some extent, on establishment-level data the agency should be collecting, as discussed in the next section.

Vacancy Data

We currently have no data on vacancies that are occasioned when the installation of a worker in a job lags behind the job

¹ Deposition of Solomon William Polachek in the case of *Lemons et al. v. The City and County of Denver*, March 24, 1978, U.S. District Court for the District of Colorado, p. 12.

² The most notable use has been of the data on office occupations in [1].

Employed Persons, by Occupation, Sex, and Age

(In thousands)

Occupation	Total		Males, 20 years and over		Females, 20 years and over		Males, 16-19 years		Females, 16-19 years	
	Oct. 1976	Oct. 1977	Oct. 1976	Oct. 1977	Oct. 1976	Oct. 1977	Oct. 1976	Oct. 1977	Oct. 1976	Oct. 1977
TOTAL	88,697	92,230	49,215	50,610	32,430	34,109	3,756	4,076	3,296	3,436
White-collar workers	44,387	46,332	21,291	21,946	20,871	22,032	611	658	1,614	1,696
Professional and technical	13,612	14,251	7,734	8,069	5,736	6,031	65	70	76	81
Health workers	2,343	2,534	809	876	1,519	1,649	3	3	13	8
Teachers, except college	3,224	3,196	898	905	2,302	2,278	3	5	21	8
Other professional and technical	8,045	8,521	6,027	6,288	1,915	2,104	59	62	42	65
Managers and administrators, except farm	9,463	9,981	7,507	7,715	1,892	2,168	37	58	27	39
Salaried workers	7,757	8,036	6,160	6,218	1,536	1,726	34	56	27	36
Self-employed workers in retail trade	905	957	656	662	247	291	2	2	--	3
Self-employed workers, except retail trade	801	988	690	836	110	152	1	--	--	--
Sales workers	5,592	5,727	2,867	2,966	2,073	2,163	252	247	400	352
Retail trade	3,096	3,093	960	953	1,576	1,604	189	202	371	334
Other industries	2,496	2,634	1,907	2,013	497	558	63	45	29	19
Clerical workers	15,721	16,373	3,183	3,196	11,170	11,670	257	284	1,111	1,223
Stenographers, typists, and secretaries	4,408	4,686	86	75	3,951	4,241	10	7	361	363
Other clerical workers	11,313	11,687	3,097	3,121	7,219	7,429	247	277	750	860
Blue-collar workers	29,354	30,536	22,144	22,827	4,779	4,987	2,030	2,260	401	462
Craft and kindred workers	11,486	11,969	10,582	10,932	473	564	393	430	38	44
Carpenters	1,077	1,214	999	1,113	8	7	67	92	4	2
Construction craft, except carpenters	2,393	2,390	2,280	2,278	23	18	92	96	--	--
Mechanics and repairers	3,031	3,243	2,860	3,072	28	52	143	119	--	2
Metal craft	1,200	1,256	1,154	1,200	20	25	24	29	2	1
Blue collar worker supervisors, not elsewhere classified	1,477	1,549	1,357	1,382	109	155	9	10	3	2
All other	2,307	2,318	1,931	1,887	285	307	59	84	31	39
Operatives, except transport	10,131	10,459	5,567	5,646	3,734	3,849	582	653	248	311
Durable goods manufacturing	4,533	4,801	2,899	3,011	1,381	1,453	178	239	74	99
Nondurable goods manufacturing	3,245	3,328	1,239	1,205	1,776	1,841	115	127	115	155
Other industries	2,353	2,330	1,429	1,430	577	555	289	287	59	57
Transport equipment operatives	3,362	3,499	2,938	3,056	235	257	178	175	11	11
Drivers, motor vehicles	2,843	2,933	2,464	2,553	219	234	149	136	10	10
All other	519	566	474	503	15	22	29	39	1	1
Nonfarm laborers	4,376	4,609	3,057	3,193	337	318	878	1,002	104	96
Construction	751	873	590	693	11	10	144	172	7	--
Manufacturing	1,055	1,066	830	814	120	109	100	132	4	12
Other industries	2,570	2,669	1,637	1,687	206	199	634	697	93	86
Service workers	12,031	12,485	3,689	3,749	6,284	6,607	823	900	1,235	1,228
Private household workers	1,177	1,191	13	23	890	946	9	21	265	200
Service workers, except private household	10,854	11,294	3,676	3,726	5,394	5,661	814	879	970	1,028
Food service workers	3,975	4,179	730	735	2,066	2,151	509	570	670	723
Protective service workers	1,257	1,291	1,144	1,174	82	101	25	11	7	5
All other	5,622	5,824	1,802	1,817	3,246	3,409	280	298	293	300
Farm workers	2,925	2,878	2,091	2,087	496	483	291	257	47	50
Farmers and farm managers	1,550	1,493	1,433	1,373	102	112	14	9	1	--
Farm laborers and supervisors	1,375	1,385	658	714	394	371	277	248	46	51
Paid workers	1,015	1,074	630	683	158	161	194	192	33	37
Unpaid family workers	360	311	28	31	236	210	83	56	13	14

NOTE: Reproduced from U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, November 1977, p. 34.

-- Not applicable.

being opened up, which occurs either through worker separation or through the job being newly created. Vacancy data are useful because, when added to employment estimates, they allow estimates of the total stock of job slots. Such information, in conjunction with labor turnover information, is useful in studying the dynamics of the labor market and in contrasting the workings of a nondiscriminatory labor market with a discriminatory one. Vacancy data were published for a number of years in the United States (in *Employment and Earnings*), but they have been discontinued, resulting in lost opportunities for research. To be maximally helpful, they should be available by occupation and industry.

Labor Turnover Statistics

Labor turnover statistics have a special place in antidiscrimination efforts. There is very little sentiment for displacing sitting jobholders to take care of members of discriminated-against groups, even if the jobholders are acknowledged to have gotten their job through a discriminatory process. The focus of antidiscriminatory efforts is, therefore, on the hiring and promotion which are now going on or will go on in the future. It is only through affecting the hiring and promotion process (the distribution of the *flows* of employees into particular job categories) that the distribution of *stocks* (the distribution of sitting employees by race by sex by job) will be affected.

Labor turnover and, in particular, accessions to employment or to a different status within a firm, provide the opportunity for change. It is extremely important for policy purposes to know the extent of such opportunities and the extent to which they have been used in a nondiscriminatory way.

In the United States, at the present time, the information available on labor turnover is totally inadequate for purposes of antidiscrimination policy. The U.S. Department of Labor publishes turnover data monthly for detailed manufacturing industries and selected nonmanufacturing industries from industry sources. For these data to be useful for antidiscrimination purposes, they would have to be broken down by race by sex by major occupation.

Another source of labor turnover data is the presently unpublished gross flow tabulations, which are based on the monthly survey of households and follow the transitions of individuals, by race, sex, and age, from their industry, occupation, and employment status in one month to their status in the subsequent month. Unfortunately, the interpretation of these data is made difficult by problems with those parts of the questionnaire of the Current Population Survey relating to labor force status—problems which have been known to exist for at least 20 years but, nevertheless, persist. Clearing up these problems to make these data usable would be a great step forward.

Problems With Currently Published Series

A major problem with the published data on unemployment is that some of the methods of collecting and editing them seem to result in minimizing the gravity of the situation of discriminated-against groups.

The following are instructions given to interviewers asking about labor force membership:

In asking item 19 ["What was . . . doing most of last week, working or something else?"], include the example which seems most appropriate plus the words "or something else" to give the respondent some choice in this answer. For adult males, say "Working or something else"; for housewives, "Keeping house or something else"; and for teen-agers, "Going to school or something else." If none of the examples seem particularly appropriate, use "Working or something else." Mark the circle which best describes the person's chief status during survey week.

On the same page of the manual, the interviewer is told that a woman might say that "her husband wouldn't permit [her to do paid work]." This would seem a tipoff to a possible problem of sexism and/or out-of-dateness of the manual's author(s). The entire manual ought to be examined for indications of this problem. Certainly, the same question should be asked of persons of both sexes, and interviewer discretion should be minimized.

Finally, some of the nomenclature used in reporting data on unemployment has an unfortunate "blame the victim" flavor, and helps to sustain attitudes inimical to improvement in the situation of minority males and women. In particular, I refer to the title of table A-13 in *Employment and Earnings*, "Unemployed Persons, by Reason for Unemployment, Sex, Age, and Race." In trying to understand that this title is an offensive misrepresentation, it is useful to distinguish between the occasion of a person's entering the state of unemployment (job losing, job leaving, entry, or reentry) and his or her persisting in that state long enough to be counted, perhaps more than once, because of failure to find an acceptable job. Once this distinction is made, it is obvious that the "reason" for the person's being unemployed is a complex one and that part of that "reason" may involve discrimination if the person is a member of a group disfavored by employers. I would, therefore, suggest substituting the words "by occasion of entry into" for the words "by reason for."

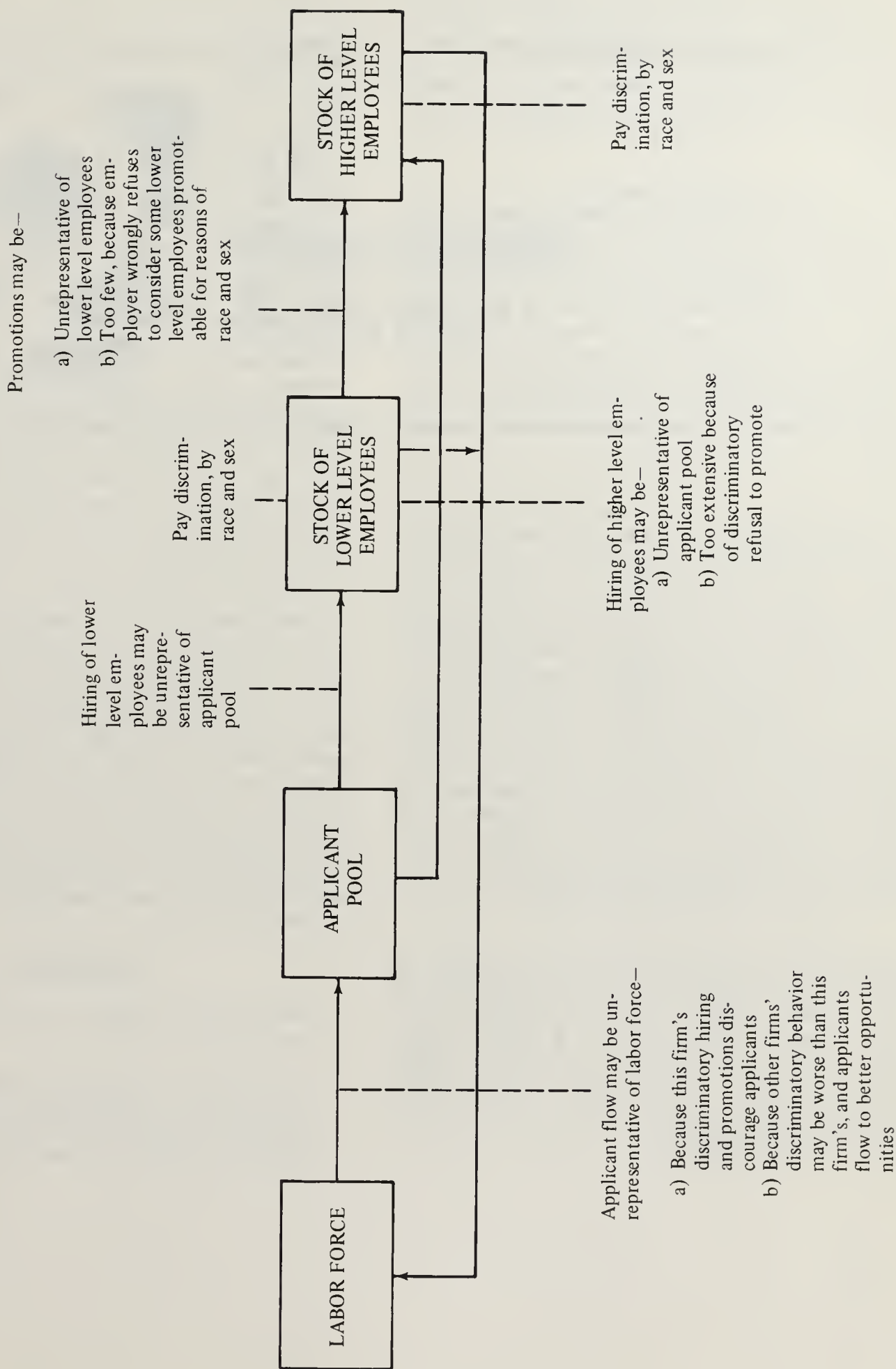
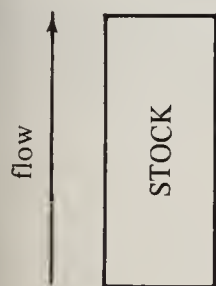
DATA NEEDS ON THE FIRM OR ESTABLISHMENT LEVEL FOR COMPLIANCE AND ENFORCEMENT PURPOSES

In discussing the information needs concerning individual firms, it is helpful, at the outset, to distinguish stocks (the labor force, the applicant pool, and the body of employed persons) and flows (the flow of applicants into the applicant pool, hires, promotions, and separations). The relations of the stocks and the flows are shown in the chart on page 47, and the possible ways in which discriminatory acts can affect the flows are indicated.

The kinds of information which both the firm itself and the enforcement authorities need to know relate to (1) what the firm is doing and (2) what a reasonable standard of non-discriminatory behavior for this particular firm might be, so that the firm's actual behavior can be compared to that standard.

Information on Firms' Behavior

In the United States, it has been the practice of the Equal Employment Opportunity Commission to ask firms to supply annually data on stocks of employed persons, by race by sex



by nine broad occupations. The only other data the firm is asked to give are the number of "formal on-the-job trainees," by race by sex, with "white collar" trainees distinguished from "production" trainees. The information requested on trainees comes near to being information on flows, since the trainees are presumably in transition to being full-fledged occupants of jobs requiring training. However, the present questionnaire obviously stops short of requiring information on all flows on a systematic basis, which would be highly desirable.

By law, these individual-establishment data are not available to the public, and only summaries by industry or area are published, except in the case of Government contractors. It would be highly desirable if all of the information reported by individual establishments (including the information on flows, recommended previously) were available to the public so that a firm's workers would know that they could get the information by going down to their public library or making a routine call to the regional office of the Equal Employment Opportunity Commission. The knowledge that this information was easily and routinely available might influence firms to structure their personnel activities in such a way as to obey the law.

The rationale usually given for keeping firm and establishment data confidential relates to the harm a firm might suffer if its "trade secrets" were exposed to the eyes of its competitors. The kind of information that could injure a firm would presumably be that which gave the rival some hint concerning new moves the firm was making that would affect its competitive position: A new plant, a new product line, a new technology, a planned change in amounts produced, etc. It is hard to see that the publication of the kinds of data which would be helpful in matters relating to employment discrimination would adversely affect a firm's competitive position and that, in any case, the public interest in reducing employment discrimination should be controlling here. Perhaps the publication might be in terms of percentage distributions of stocks and flows, by race by sex, rather than absolute numbers, which would retain the information content necessary for matters relating to discrimination but reduce the information content concerning other matters.

It would also be helpful if information on average wage rates by race by sex within occupation were collected and published by the enforcement agency. This would help to detect pay discrimination and would also be helpful in showing the extent to which women and Blacks were making progress within broad occupational groups. Again, absolute dollar amounts are not essential; all that would be required for antidiscrimination purposes would be the ratio of the wage for each race/sex group to the wage for White males within the major occupation group.

Setting Standards of Nondiscriminatory Behavior

The most important information which is relevant to the determination of what should, under a nondiscriminatory regime, be expected to go on in an individual firm concerns the availability of members of each race/sex group who can be deemed competent to fill various jobs. In the United States, information which relates to these issues, by local labor market, is issued annually.

The most important issue relates to competence. If employers are allowed to take the view that the pool of persons from whom they chose need include only those already in the occupation or that the pool from which applicants are drawn should have the same race/sex composition as those already in the occupation, then very little progress can be expected. Since discrimination by race and sex in the United States has been pervasive, the current distribution of persons by occupation reflects that history. The key to an understanding of this matter is that there is always recruitment into an occupation of persons who are inexperienced in that occupation; if this were not so, natural processes would reduce the occupation to zero. The issue is to define the pool of new entrants in a nondiscriminatory way and to insist that the employer has an obligation to induct new entrants from that pool, where a sole or major reliance on the pool of persons experienced in that occupation would continue to produce a stock of persons which excluded members of certain race/sex groups.

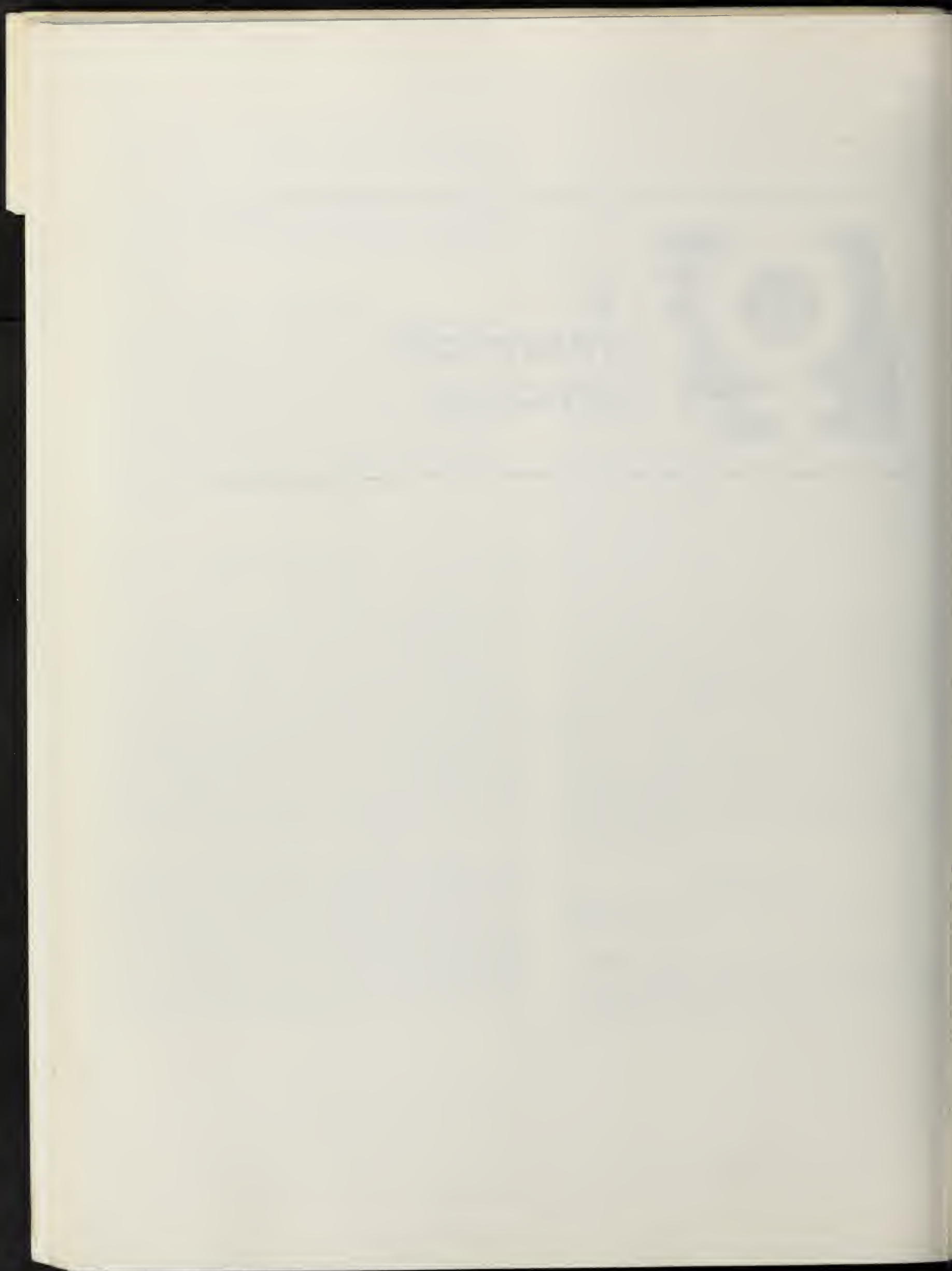
It should be the responsibility of the enforcement agency to issue guidelines as to the race/sex composition of the (nondiscriminatory) pool of persons who might be eligible to be new inductees into each broad occupational group. These guidelines might take into account valid educational criteria, as well as regional availability of persons, by race/sex. Ideally, for each firm for which the enforcement agency issues a report on its record on hiring, promotions, and employment, information on the appropriate composition of the pool of inductees, tailored to the establishment's local labor market conditions, could be issued. This would be maximally useful to the public and, in particular, to employees of and applicants to those firms in being able to satisfy themselves that they have been dealing with an establishment which was abiding by the law.

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V.
Household
Structure



HOUSEHOLD STRUCTURE: INTRODUCTION

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Federal agencies have been collecting data for many decades on various aspects of family and household structure in the United States. Trend data on such measures as the timing and stability of marriages, the timing of births and family size, the composition of households, and the characteristics of household "heads" reveal that we are now in a period of rapid social change. We are currently experiencing unusually high rates of marital instability; out-of-wedlock childbearing has been on the rise (yet, overall, women are having fewer children than ever before); and there has been a dramatic rise in the number of father-absent families—that is, women with children living alone or with other relatives. These trends, as well as others, are documented in the two papers for this session: One by Farley and Bianchi, and the other by Watts and Skidmore. These papers discuss some of the implications of these trends for individuals and for the family's economic welfare. Watts and Skidmore also discuss some inadequacies in the presentation of social statistics, including criticism of the "head-of-household" concept, and offer for consideration a new household classification system.

Rather than elaborating further on the many important changes in the family noted by the authors of these papers, I would like to speak to the broader issue of the relationship between homework and marketwork and the need for comparable data for men and women in this context. Interest in this issue emanates from the premise that men and women do not participate equally outside the home if their work roles inside the home differ substantially. We are familiar with the traditional view of the division of labor between the sexes: men assume the responsibility of economic provider and women assume the responsibility of home maintenance, including childrearing. This view is becoming less and less a reality. The increased participation of women in the labor force in recent decades has considerably eased men's role as provider. To what extent has this been complemented by the increased participation of men in home maintenance to ease women's role in this sphere? The paucity of national data on the extent to which both men and women participate in childrearing and household tasks is glaring. Resistance to collect such data may well reflect the resistance of men to engage in such activities. Yet, this issue is critical to the survival of the family and may, in part, explain the low rates of childbearing, as well as the high rates of marital instability. Not only do we need to assess the differential participation of men and women in familial roles but also the effects of this differential participation on the status of women vis-a-vis

men outside the family. For example, to what extent are childrearing and household tasks constraining to both men's and women's educational attainment, labor force participation, and occupational mobility? Questions such as this require that we have comparable data for men and women. We need to assess differences between spouses, as well as between men and women in the aggregate, so that the family context can be evaluated.

It is the childrearing demands, more so than housekeeping, that seem to be the major constraint on female achievement outside the home. One mode of easing this constraint (and of sharing familial rewards) is for men to play a greater role in the day-to-day activities of childrearing. Another mode (which seems to meet with less resistance) is to arrange for nonparents to care for the children. This is the mode adopted by most employed women with young children. National data are available on the types of child-care arrangements employed women make. (See for example [1; 2; 4; 5; 6; 7; 8].) But we also need to consider the extent to which women and men who are not employed are constrained from seeking employment because of the unavailability of child care at reasonable cost. The June 1977 Current Population Survey included a supplement on child care that permits an analysis of this issue for women with preschool-age children (see [3]), but this is only a modest start toward understanding a highly complex issue. In the future, more detailed questions need to be asked of both men and women. We also need to explore the child-care search process, which for parents (particularly women) is such an integral part of the job search process.

Nonmarried parents with children (most commonly women) are especially burdened by the multiple demands of marketwork and homework. The costs of child care may not be much less than the mother could earn herself. For the never-married mother, public assistance is often the only feasible option. For the divorced or separated mother, dependence on public assistance is often contingent upon the extent to which she receives child support or alimony from the child's (or children's) father. The absence of national data on the extent of paternal support for children reared by non-married mothers is, again, glaring. We need to know not only the amount of court-ordered payments, but the actual amounts paid and for how long. Moreover, we need data on the socioeconomic characteristics of both the providers of child support and alimony and the recipients. Only then can we assess the economic burden of childrearing for both sexes in the absence of marriage, relative to one's ability to pay, and

the extent to which underpayment places demands on the taxpayer in the form of public assistance.

In summary, I would like to stress the need for national data for both men and women in the following three areas:

1. The extent to which married men and women participate in household and childrearing tasks.
2. The extent of child-care constraints on the educational attainment, employment, and occupational mobility of men and women.
3. The extent to which child support and alimony are provided (by socioeconomic characteristics of the provider) and received (by socioeconomic characteristics of the recipient).

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HOUSEHOLD STRUCTURE AND WELFARE: COMMENTS ABOUT RECENT TRENDS AND DATA NEEDS

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INTRODUCTION

During the last 20 years, substantial changes have occurred in family structure in the United States, changes which have implications for welfare trends. In brief, the proportion of people living in traditional husband-wife families has declined, while the proportion living in families headed by women has risen. Since families with women as heads typically have per capita incomes lower than those in husband-wife families, this shift represents a change from families which are economically secure to families in more precarious economic situations. The first part of this paper examines recent changes in family composition, while the second part describes economic implications of these alterations and explores why income levels differ by type of family or household. Since there are large and persistent racial differences in both family structure and welfare, data are analyzed separately for Blacks and Whites. The final section describes changes in data collection which would permit us to better measure the changing composition of families and their welfare.

RECENT TRENDS IN FAMILY AND HOUSEHOLD COMPOSITION

Changes in family and household living arrangements may be most succinctly summarized by examining trends in marital status, family or household headship, fertility, and the living arrangements of young children.

Changes in Marital Status

The most dramatic shifts regarding marital status are the increases in first marriage among the young and the increasing openness for marriages to be dissolved by divorce. Among both men and women, Whites and Blacks, sharp declines are evident in the proportion of people who marry at early ages. Among Whites under 25 years old, the proportion who have ever married is presently lower than at any previous date since World War II [15, table 104; 20, table A]. For instance, in 1950, 68 percent of the White women 20 to 24 years old reported they had married, whereas in 1978, only 57 percent of the White women in this age range had married. Data about the marital status of Blacks are available since 1890 and, at

present, a record low proportion of Blacks under 25 years old have married.

The studies of Preston, Weed, and others demonstrate a secular trend toward increasing divorce [2, pp. 54-59; 6, pp. 74-80; 9, pp. 15-19; 10, p. 457; 11, p. 1 and table 1; 18, table 10; 29]. Approximately 20 percent of the marriages contracted in the 1920's ended in divorce, but current rates imply that upwards of 50 percent of the marriages of the 1970's will eventually be dissolved in this fashion. If increases in divorce rates are matched by rises in the remarriage rate, the increase in divorce will not alter the proportion of adults in the marital status categories associated with discord. However, if the divorce rate rises when the remarriage rate is constant or falling or if the interval between separation and remarriage lengthens, the proportion of adults who are married and live with their spouses will decline. Glick and Norton show that through 1970 the divorce and remarriage rates rose concurrently, but since then, the divorce rate has increased, while the remarriage rate has fallen [8, p. 303; 9, fig. 1].

Because of these changes, a decreasing share of adults is married and living with a spouse and an increasing share is divorced or separated from their spouses. Table 1 presents age standardized data showing the proportion of adults in each marital status category in 1960 and 1976. Among White women, the proportion living with husbands changed from 65 to 63 percent, but the proportion who were currently divorced rose from 3 to 6 percent. Changes among Black women are much greater. In 1960, just under one-half of the Nation's adult Black women were married and living with their husbands, but by 1976, this declined to about 4 women in 10. Throughout this period, the proportion of Black women who were either separated from their husbands—that is, married-spouse-absent or divorced—rose from 15 percent in 1960 to 22 percent in 1976. Trends among men are quite similar, particularly the rise in the proportion divorced or separated.

The analysis of data was supported, in part, by a U.S. Department of Labor grant to Suzanne Bianchi, "Racial Inequality in Family Welfare, 1960 to 1976," Grant No. 91-26-78-24.

Table 1. Percent Distribution of the Population 15 Years Old and Over, by Sex, Marital Status, and Race: 1960 and 1976

(Data have been standardized for age using the age distribution of the population in 1960 as the standard)

Sex and marital status	Whites			Blacks		
	1960	1976	Change	1960 ¹	1976	Change
WOMEN						
Total	100.0	100.0	-	100.0	100.0	
Single	17.3	17.3	-	16.9	22.6	+5.7
Married, spouse present	65.1	63.2	-1.9	48.4	40.5	-7.9
Married, spouse absent	2.8	2.8	-	11.2	13.0	+1.8
Widowed	12.3	11.2	-1.1	19.2	16.0	-3.2
Divorced	2.5	5.5	+3.0	4.3	7.9	+3.6
MEN						
Total	100.0	100.0	-	100.0	100.0	
Single	23.6	22.8	-.8	26.6	27.1	+.5
Married, spouse present	69.0	69.2	+.2	56.7	52.8	-3.9
Married, spouse absent	2.0	2.0	-	8.6	9.5	+.9
Widowed	3.6	2.3	-1.3	6.0	4.4	-1.6
Divorced	1.8	3.7	+1.9	2.1	6.2	+4.1

- Entry represents zero.

¹ Data for 1960 refer to non-Whites.Source: Bureau of the Census, *Current Population Reports*, Series P-20, No. 105, table 3; No. 306, table 1.

Family and Household Composition

A consequence of delayed marriage and increased divorce is a substantial change in the distribution of household or families by type. According to current definitions by the Bureau of the Census, all occupants of a dwelling unit are defined as a household. A family consists of two or more persons who are related by blood, marriage, or adoption and who share a residence in the same dwelling unit [23, pp. 300-301]. Families are classified into three types: Those headed by married couples, those headed by women who live with one or more relatives but not their husbands, and those headed by men who do not live with their wives [7, pp. 210-212]. The majority of families headed by women—74 percent of the White and 85 percent of the Black in 1976—include dependent children but some consist of sisters or other relatives who share a household [17, table 9].

Perhaps the most sensitive indicator of the changing living arrangements of adults is the shifting distribution of families by type. Figure 1 shows 1960 to 1978 trends in the proportion of families which were husband-wife families and the proportion headed by women. At all dates a small share of families—under 5 percent—was headed by men who did not live with their wives.

Among Whites, the share of families which were husband-wife families declined moderately, from 89 percent in 1960 to 86 percent in 1978, while the proportion headed by women rose from 9 to 12 percent [16, table 4; 22, table 1]. Changes among Blacks have been more pronounced. The proportion of families headed by husbands and wives declined 18 per-

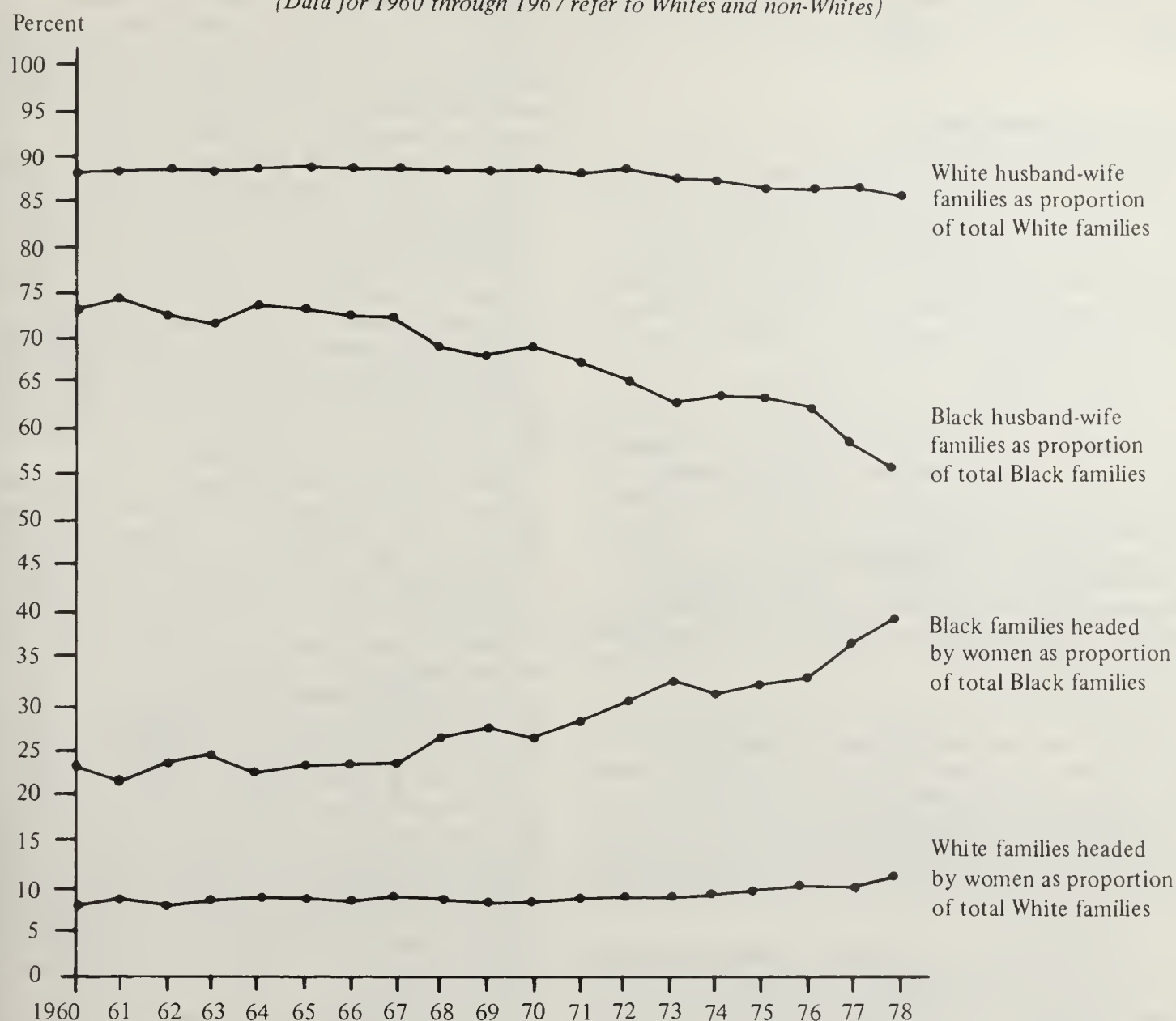
centage points in this 18-year span, that is, from 74 percent to 56 percent. There has been a corresponding increase in the share of Black families with women as heads, and in 1978 just under 4 Black families in 10 were headed by women. This is higher than during the Depression or any previous date for which tabulations are available [5, table 3].

The changing distribution of families by type—illustrated in figure 1—results from shifts in the marital status of adults and the increasing tendency of women to head their own families rather than living with husbands, relatives, or friends. Ross and Sawhill [12, pp. 94-99] contend that economic changes in recent years have made it easier for women to head their own families or households. They point to the increased labor force participation of women, the higher wages some women receive, and increases in the amount and availability of welfare payments. While there is ambiguity about whether these changes in themselves lead to marital disruption, it is reasonable to assume that women who experience marital disruption or who bear an illegitimate child are now more able to head their own families than similar women were 15 years ago.

Increases in family headship by women are sharp, and table 2 summarizes these trends. Women have been classified by their marital status, and the proportion who headed their own families is shown for 1960 and for 1977. In 1960, fewer than 30 percent of the women who were then divorced or separated from their husbands were heading families, but by the late 1970's, 60 percent of the Black and about one-half of the White women were doing so. In brief, it used to be that once a couple terminated their marriage, the woman usually lived

Figure 1. Husband-Wife Families and Families Headed by a Woman as a Proportion of Total Families, by Race: 1960 to 1978

(Data for 1960 through 1967 refer to Whites and non-Whites)



Source: Bureau of the Census, *Current Population Reports*, Series P-20, Nos. 106, 122, 125, 139, 153, 164, 173, 191, 200, 218, 233, 246, 258, 276, 282, and 307; Series P-60, Nos. 107 and 116.

Table 2. Percent of Women 14 Years Old and Over Who Head Families, by Marital Status and Race: 1960 and 1977

Marital status	Whites			Blacks		
	1960	1977	Change	1960 ¹	1977	Change
Single	3.3	3.0	-0.3	3.5	15.1	+11.6
Married, spouse absent	27.1	49.5	+22.4	27.6	64.2	+36.6
Divorced	29.3	48.9	+19.6	29.9	62.0	+32.1
Widowed	30.2	21.2	-9.0	36.2	42.6	+6.4

¹ Data for 1960 refer to non-Whites.

Source: Bureau of the Census, *1960 Census of Population*, PC(2)-4B, table 2; *Current Population Reports*, Series P-20, No. 323, table 6.

with her relatives or her own parents. Today, she is likely to head her own family. There has also been a rise—especially sharp among Blacks—in the proportion of single women heading families, perhaps reflecting the increasing tendency of women to retain the children they bear prior to their marriage.

Fertility and Childbearing

Since 1957, fertility rates in the United States have declined rapidly. The annual number of births peaked at about 4.3 million in 1957 and, by 1975, sank to 3.1 million—a decline of 28 percent [24, table 1; 26, table 1-2]. Because the female population grew in this interval, the decline in fertility rates was even sharper. The total fertility rate, for example, dropped from about 3.8 births per woman to 1.8, a decrease exceeding 50 percent [21, fig. 1-4].

The decline in fertility in the United States has largely been a drop in childbearing within marriage, since the fertility rates of those women who are not married are currently higher than they were in the early 1950's. Legitimate and illegitimate general fertility rates for Whites and non-Whites were calculated for 1950 to 1975 [4, fig. 3B]. Among women who reported they were married, the frequency of childbearing increased rapidly after 1950 and attained a peak in 1957 for Whites and the next year for non-Whites. Since that time, childbearing within marriage has declined, and the legitimate fertility rates for both races in 1975 were about two-thirds as great as those of 1950.

Fertility rates for women who are not married follow a different pattern. The maximum rates were reached at later dates, and the recent drops have been smaller. Among both races there have been modest decreases, but in 1975, which is the last year for which data are available, the illegitimate general fertility rates were much higher than comparable rates 25 years earlier; indeed, the White rate in 1975 was twice that of 1950, and the non-White rate was 49 percent greater [21, ch. 5; 28, pp. 20-24].

The changing fertility rates have two pronounced effects upon family organization and living arrangements. First, an increasing proportion of women bear a child prior to marriage. Approximately 4 percent of the White women who married for the first time in the Depression decade bore a child before marriage. Among those first marrying in the early 1970's, 6 percent had a child prior to the wedding. For Blacks, the change was even greater; from 18 percent with a child before marriage among those married in the 1930's, to 38 percent for those first marrying in the 1970's [19, tables 27, 28].

Second, there has been a substantial shift in the distribution of births by legitimacy status. In 1950, about 1 birth in 25 occurred to an unmarried woman, but, in 1975, about 1 birth in 7 was illegitimate. Similar trends are evident for both races, but the rise in the proportion illegitimate has been greater among Blacks. In 1950, 18 percent of the Nation's non-White births were delivered to unmarried women, but by 1976, this increased to 50 percent. Among Whites, the change was from 2 percent illegitimate in 1950 to 8 percent in 1976 [25, table 12; 27, table 1-29].

The Living Arrangements of Young Children

Because of increased illegitimacy and marital disruption, young children are now much less likely to reside in house-

holds with both their parents than children were some years ago. Bureau of the Census tabulations provide only a limited amount of information about this topic.

Figure 2 indicates the proportion of children who either lived with both their parents—real or adoptive—or with their mothers only; that is, they lived in families which included their mothers but not their fathers. These data have been standardized for age to adjust for the shifting age distribution of children brought about by declining fertility.

This figure succinctly portrays the very large racial difference. At all dates, a much higher proportion of White than Black children lived with both their parents, but this proportion has decreased among both races. About 9 White children out of 10 in 1960 were in families with both their parents, but by 1977, this fell to 85 percent. A greater shift occurred among Blacks and the decline was from about two-thirds living with both parents in 1960 to less than one-half in 1977. The major offsetting change has been the increasing propensity of children to live in families headed by their mothers. In 1977, 42 percent of the Black children and 12 percent of the White children were in such families.

There have been small fluctuations in the proportion of children living with their fathers only, and at all dates, about one percent of the Whites and 2 percent of the Blacks were in this status. Since 1960, there has been a modest decline in the proportion who live with neither parent, but the racial difference remains great. About 11 percent of the Black children contrasted to only 2 percent of the White children, live with neither of their own parents [20, table 5].

The changes reported in this section of the paper may be summarized by noting that a decreasing share of the population lives within husband-wife families and an increasing fraction live in either families headed by women or as primary individuals—that is, they live apart from any relatives. Data from the public use samples of the 1960 census and from the March 1976 Current Population Survey were analyzed to classify the population by type of household. Table 3 reports recent changes in the proportion of people—adults and children—living in households which contained husband-wife families, other types of families, or households headed by primary individuals.

The declining proportion in husband-wife families is evident for both races; a drop from 87 percent in such households for Whites in 1960 to 80 percent in 1976 and an even larger change, from 72 percent to 55 percent, among Blacks. For both races, the proportion in households which contained families headed by women rose.

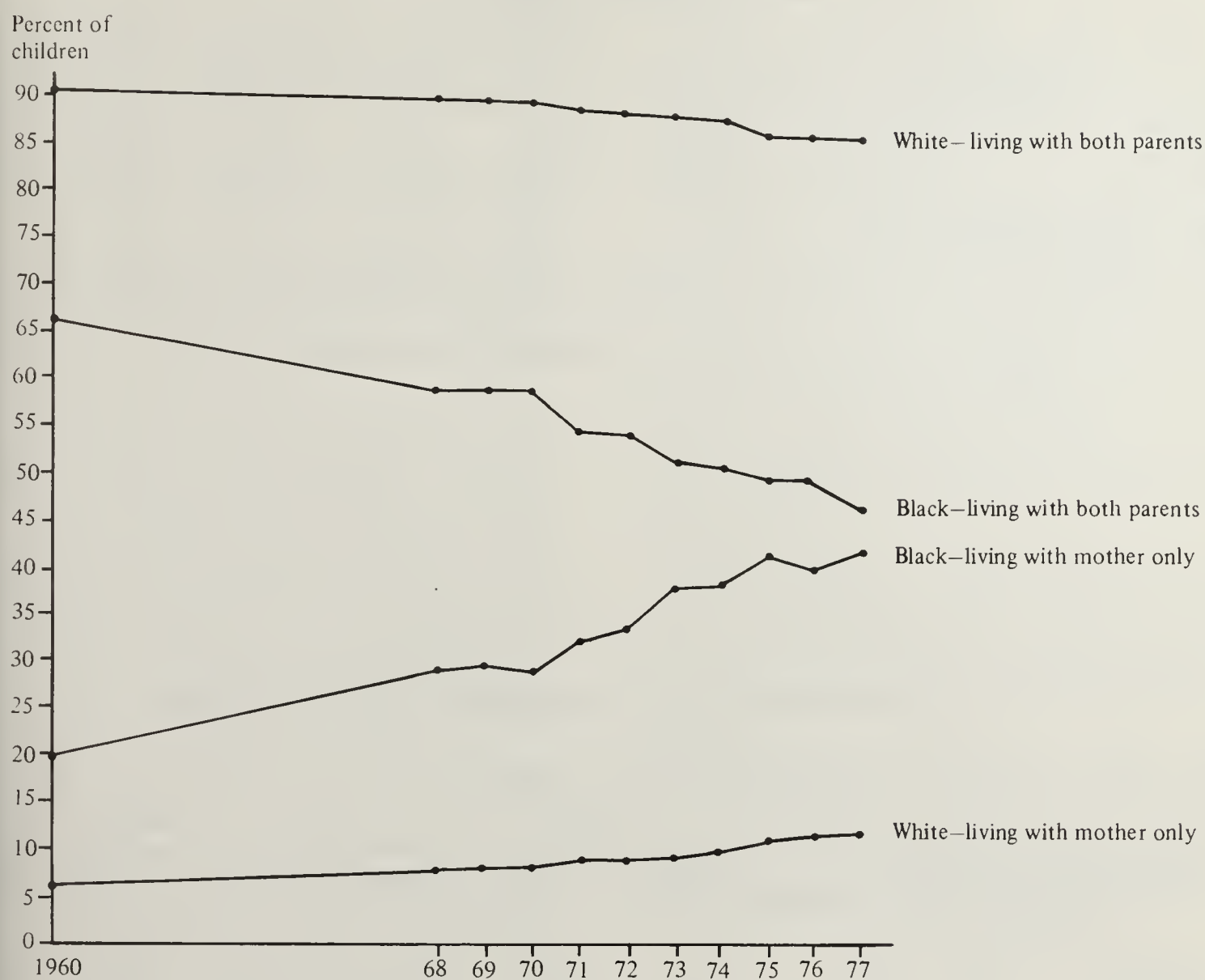
ECONOMIC TRENDS AND IMPLICATIONS OF THE CHANGING LIVING ARRANGEMENTS

In the United States, income levels are much higher in households which include a husband-wife family than they are in households headed by women. Recent shifts in family structure imply a change away from the type of living arrangements where welfare levels are highest and into households where economic conditions are less secure.

Information about trends over time in the welfare of persons—as measured by income—in different types of households is shown in table 4. Data from the 1960 Public Use Sample and from the March 1976 Annual Demographic File were used to determine the per capita income of persons living in different types of households. Since the majority

Figure 2. Proportion of Children Under 18 Years Old Living With Both Parents or Living With Their Mother Only, by Race: 1960 to 1977

(Data for 1960 refer to Whites and non-Whites)



Source: Bureau of the Census, 1960 Census of Population, PC(2)-4B, tables 1, 2, and 19; Current Population Reports, Series P-20, Nos. 187, 198, 212, 225, 242, 255, 271, 287, 306, and 323.

Table 3. Percent of Population Living in Households, by Type of Household and Race: 1960 and 1976

Type of household	Whites			Blacks		
	1960	1976	Change	1960	1976	Change
Total	100	100	—	100	100	—
husband-wife family	87	80	-7	72	55	-17
female-headed family	6	9	+3	19	32	+13
male-headed family	2	2	—	3	3	—
female primary individual	3	5	+2	3	5	+2
male primary individual	2	4	+2	3	5	+2

— Entry represents zero.

Source: Bureau of the Census, 1960 Census of Population, Public Use Sample Tape; Annual Demographic File, March 1976.

Table 4. Per Capita Income, by Type of Household and Race: 1960 and 1976

(Constant 1975 dollars)

Type of household	Whites			Blacks		
	1960	1976	Change	1960	1976	Change
Total	3,466	5,041	+1,575	1,699	2,911	+1,212
Husband-wife	3,413	5,002	+1,589	1,693	3,210	+1,517
Female-headed	3,266	4,197	+913	1,422	2,031	+609
Difference between husband-wife and female-headed	147	805	(X)	271	1,179	(X)

X Not applicable.

Source: Bureau of the Census, 1960 Census of Population, Public Use Sample Tape; Annual Demographic File, March 1976.

Table 5. Sources of Income, by Type of Household and Race: 1960 and 1976

(Constant 1975 dollars)

Type of household and source	Whites			Blacks		
	1960	1976	Change	1960	1976	Change
ALL HOUSEHOLDS						
Average income.	11,218	14,335	+3,117	6,525	9,222	+2,697
From earnings	9,950	11,841	+1,891	5,807	7,461	+1,654
From nonearnings	1,268	2,494	+1,226	718	1,761	+1,043
HUSBAND-WIFE HOUSEHOLDS						
Average income.	12,562	17,110	+4,548	7,667	12,796	+5,129
From earnings	11,406	14,748	+3,342	7,077	11,273	+4,196
Earnings of husband	9,110	11,395	+2,285	5,007	7,332	+2,325
Earnings of wife	1,407	2,447	+1,040	1,227	3,007	+1,780
Earnings of other adults	839	838	-1	797	883	+86
Earnings of teenagers	50	68	+18	46	51	+5
From nonearnings	1,156	2,361	+1,205	590	1,523	+933
FEMALE-HEADED HOUSEHOLDS						
Average income.	6,266	7,414	+1,148	4,382	5,835	+1,453
From earnings	4,518	4,419	-99	3,405	3,746	+341
Earnings of female head	2,801	3,262	+461	1,731	2,719	+988
Earnings of other adults	1,692	1,127	-565	1,626	992	-634
Earnings of teenagers	25	30	+5	48	35	-13
From nonearnings	1,748	2,995	+1,247	977	2,089	+1,112

Source: Bureau of the Census, 1960 Census of Population, Public Use Sample Tape; Annual Demographic File, March 1976.

individuals—94 percent of the Whites in 1976 and 92 percent of the Blacks (see table 3)—lived in either households with husband-wife families or households headed by women. Data are shown for only these two types of households. Female-headed households include families headed by women as well as female primary individuals. The data collected in 1960 and 1976 refer to income received in the previous year. To control for inflation, figures are shown in constant 1975 dollars [1, pp. 76-86].

We observe, first, a general rise in welfare. Per capita income among Whites increased by about \$1,600, and in 1976, the typical White household had a per capita purchasing power approximately 45 percent greater than it did 16 years earlier. Among Blacks, there was a slightly smaller increase in per capita income and the racial difference in income, which was large at the start of this interval, increased. This racial gap widened from approximately \$1,800 at the start to \$2,100 in 1976.

Second, there were improvements in per capita income for both husband-wife and female-headed households. We can be certain that the economic gains of the last two decades have not been restricted to husband-wife households. However, the gains have been greater in husband-wife households, and thus, the economic gap, which separates households headed by women from husband-wife households, widened. In 1960, per capita income for those women and children who lived in female-headed households was only \$147 inferior to that of husband-wife households, but by 1976, the difference had grown to \$805. Among Blacks, the change was from a difference of \$271 to a difference of \$1,179. For both races, the per capita gap increased by a factor of 5 in this short period of time.

We wished to further explore reasons for the widening gap in the economic welfare, illustrated in table 4, and thus, we aggregated the income of households. Once again, the Public Use Sample tape from the census of 1960 and the 1976 Annual Demographic File were analyzed, and income was divided into earnings and nonearnings. The latter component includes monies received from governmental transfer programs, from rents or royalties, as well as benefits from retirement programs or alimony. In husband-wife households, earnings are divided into those received by the husbands, by the wives, by other adults 18 years old and over who lived in the household, and by teenagers under 18 years old. In households headed by women, earnings were disaggregated into those received by the women, by other adults in the households, and by teenagers. Again, figures are adjusted for inflation and represent the 1975 purchasing power of the dollar. The income levels are shown for the average households of each type. Of course, not all households in each category received income from all of the sources which are listed.

Average income levels increased in households for both Whites and in both husband-wife and female-headed households. The gain in average income among Whites—\$3,117—exceeded that for Blacks—\$2,697. However, for both husband-wife households and those headed by women, Blacks showed greater gains than Whites. This apparent anomaly came about because of the rapid shifts in the distribution of Black households by type. As indicated in figure 1 and table 3, there was a shift away from husband-wife households and thus, even though the incomes of specific types of Black households have increased faster than those of comparable White households, the average income of all Black households rose less rapidly than that of all White households. Had there been

no shift in the distribution of Black households by type between 1960 and 1976, the income of total Black households would have risen more rapidly.

Within husband-wife households, income levels have risen in the last 16 years largely because of greater earnings by both husbands and their wives. The relative increase in earnings has been greater for wives than for husbands and this primarily reflects the growing labor force participation of married women [1, table 7-2]. At both dates, the earnings of other adults and teenagers contributed only a small fraction of a household's total earnings.

Changes in the income of households headed by women are very different. In White households, earnings have actually declined, while in Black households, they increased only a bit. There has been a rise in the earnings of women who head these households, but this has been offset by a decreasing contribution from the earnings of other adults who live within these households. This reflects the changing nature of female-headed households. In 1960, a much higher proportion of the female-headed households included two adults than in 1978 [1, table 4-7]. Apparently, this comes about because women who have children but no husband are now much more likely to live by themselves than with their own mothers or with other relatives.

Increases in nonearned income played an important role in maintaining the welfare of households headed by women. Indeed, the average income of households with White women as heads would have decreased if there had not been a rapid rise in nonearned income. By 1976, nonearned income accounted for upwards of 40 percent of the income of households headed by women.

We conclude that husband-wife households have increased their average incomes largely because of greater earnings by both husbands and wives. Households headed by women report more modest improvements in income, because the earnings of the women who head these households have risen less and because the earnings contributions of other adults in these households have declined.

DATA NEEDS

When considering data needs, it is appropriate to focus upon fundamental questions. First, how rapidly is household or family status changing, and how long do individuals typically spend in various types of households? Second, how adequately do present measures assess the economic well-being of households of different types?

Changes in Household and Family Composition

Data from the Current Population Survey (CPS) provide valuable information about household composition and income at one point in time, but they supply little information about changes over time for the same households. Many important questions cannot readily be answered from present data sources such as—

1. How rapidly does household composition change?
2. Are there important socioeconomic or geographic differentials in the marriage or divorce rate?
3. What is the typical interval between separation and remarriage, and does this vary by social or economic characteristics?

4. How long do children typically spend in single-parent households?

The current longitudinal design of the CPS insures that one-half of the housing units sampled any March are also visited the next year. This does not guarantee that the same individuals are contacted sequentially. It should be possible to make certain that some fraction of the persons interviewed one March are also interviewed the next year. The experiences of William Sewell with high school seniors in Wisconsin [13, ch. 2], James Morgan with his panel study of income dynamics [3, app. A], and Deborah Freedman with Detroit area wives first interviewed in 1962 [14] suggest that the difficulties of locating most recent movers are not excessive.

If sequential data were obtained from a sample of 20,000 or 30,000 households, it would be possible to calculate birth rates, marriage rates, and separation or divorce rates controlling for a variety of demographic characteristics.

These data would facilitate an analysis of changes in household welfare. An investigator could then determine the extent to which poverty is reduced by declines in household size, as opposed to changes in earnings or transfer payments. Information about rates of change in family composition could be used with analytic techniques, such as multiple decrement life tables, to ascertain the average intervals children and adults the economic gap between the types of households.

The Composition of Household Income

Do the questions which are asked in the CPS surveys and the decennial census allow us to adequately measure differ-

entials in the economic welfare of families of various types? At present, the questions focus upon earned income and monetary transfer payments. There are no questions about rent subsidies or the use of specific programs, such as food stamps and free lunches in schools. We know little about whether divorced parents frequently receive gifts or non-monetary income from their estranged spouses. It may be that families headed by women obtain these benefits more frequently than husband-wife families, and thus, the present indicators may overstate the gap in income levels.

The welfare of any household depends not only upon its current income but upon the resources which it might tap if specific needs suddenly arose. These resources might include benefits from insurance or from the possible sale or conversion of assets. The CPS does not gather information about these sources of potential income. If extensive insurance coverage is more common among husband-wife families and if they typically possess greater tangible assets than families headed by women, the current estimates may understate the economic gap between the types of households.

To determine the annual income of a household, we sum the income reported in March of one year and assume that those funds were available to the family in the previous year. We do not know how long each of the income recipients lived within that household during the previous year or whether an earner was in a given household when he or she had earnings. If there were a longitudinal component to CPS, we might be able to assess whether it is appropriate to assume that all income reported by household members in March of one year was available to that household throughout the previous year.

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HOUSEHOLD STRUCTURE: NECESSARY CHANGES IN CATEGORIZATION AND DATA COLLECTION

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An alternative future . . . would require the study of the entire structure of work and family life as it affects women, men, and children [as a prerequisite for] active planning for change. Such a future is unquestionably optimistic and idealistic, but it is not beyond the realm of the possible if we have the national will to press for it.¹

The statistical concepts used to describe our economy and society, and the methods used to collect data for their measurement, were designed when the world was assumed, by and large, to be made up of households with a particular family composition—a working husband (the breadwinner), plus a nonworking wife and two children, all dependent upon his earnings for their economic support. The membership of these families was considered fixed—the parental couple for the duration of their adult lives and the children until they, in turn, grew up and established their own similarly constituted families. Whether or not U.S. society ever really fit that description, clearly it does so no longer. Many of our statistical series, therefore, are data shoehorned into what has become an ill-fitting and constraining framework.

In this paper, we first show how household structure and the behavior of household members have been changing. We then discuss inadequacies in the current presentation of social statistics and argue that the individual should be the central focus. Third, we discuss the principles and problems involved aggregating individuals into households and families and recommend a new schema for household classification. Finally, we make some suggestions for new data collection. Our purpose, thus, is to delineate the data we need for adequate “study of the entire structure of work and family life as it affects women, men, and children.”

RECENT TRENDS IN THE BEHAVIOR OF INDIVIDUALS IN HOUSEHOLDS

The first trend to be pointed out in any discussion of changing social behavior is usually the increasing labor force participation of women. This trend is most marked for married women and includes mothers of small children. Accompanying this trend, in contrast, is a secular decline in the labor force participation of men.

¹ Quoted from *Women Working: Toward a New Society*, by Alan Pifer, President, Carnegie Corporation of New York, in the foundation's 1976 annual report.

In 1955, only 32 percent of the civilian labor force were women. By 1976, the female civilian labor force accounted for 41 percent of the total. The changing patterns for married women have been a major factor. Participation rates for wives increased by almost two-thirds between 1955 and 1976—from 28 to 45 percent. (Rates for husbands actually decreased from 91 to 82 percent over the same period.) This increased labor force participation is characteristic of women of all ages, though most marked for those younger women. By 1976, for instance, half the married women 25 to 34 years old were in the labor market. Nor is this increase due to the fact that fewer families have children. The labor force participation of wives with children 6 to 17 years old increased from 35 percent in 1955 to 54 percent in 1976. For wives with children under 6 years old, the rate more than doubled, from 16 to 37 percent.

As a consequence of this marked change, there has been a steady increase in the proportion of multiearner families, including increased proportions of husbands whose earnings are not the sole support of their wives and children. Of the husbands in the labor force in 1955, less than one out of four had wives in the labor force, and two out of five had one or more family members in the labor force. By 1976, two out of four had wives in the labor force, and three out of five had one or more family members in the labor force. Note that these changes took place during a period when average family size was decreasing. In 1955, 38 percent of the husbands with jobs had at least one family member also working. By 1976, this figure had increased to 55 percent.

Other earners in the family have also provided increasing insulation against the consequences of job loss by the husband.

The first section of this paper is based on Harold W. Watts and Felicity Skidmore, The Implications of Changing Family Patterns and Behavior for Labor Force and Hardship Measurement, Madison, Wis.: Institute for Research on Poverty, March 1978, prepared for the National Commission on Employment and Unemployment Statistics. Most of the statistics quoted are from U.S. Department of Labor and U.S. Department of Health, Education, and Welfare, Employment and Training Report of the President. Washington, D.C.: U.S. Government Printing Office, 1977.

In 1955, 42 percent of unemployed husbands had employed family members. By 1976, 51 percent of unemployed husbands had someone else in the family working. The situation for unemployed women who head families is distinctly worse, as the figures for the first quarter of 1977 show. Of the unemployed men heading families, nearly half had someone in their family with a job in that quarter. Of the unemployed women heading families, only 18 percent had a family member with a job. In fact, if a breadwinner is defined as someone with dependents who is the only family member in the labor market, a higher proportion of working women who head families now fill that role than working men.

The second major characteristic of American society today which belies the validity of the breadwinner family stereotype is the substantial volatility in family composition. The husband-wife family is still very much the predominant form of family in the U.S. today (accounting for 84 percent of all families). It does not mean, however, that the same husbands remain married to the same wives, that children remain attached to the same husband-wife combination, or that only a small minority of people ever belong to a single-parent family.

The divorce rate is now between 30 and 40 percent and rising. The remarriage rate is also rising. In 1970, it was 32 percent for women 55 to 64 years old, 45 percent for women 50 to 54 years old, and 53 percent for women 45 to 49 years old. The average duration between first and second marriages (very few marry more than twice) is about 5 years. Thus, although only about 16 percent of American families in 1976 were not husband-wife families, a much higher proportion than that can expect to experience disruption. A substantial proportion of the Nation's children, in consequence, also go through the experience of living with a single parent. It has been estimated that as many as 46 percent of American children may experience marital breakup in their family at some point during their upbringing.

Another important factor in family membership volatility is the rapidly increasing incidence of one-person families—for most people, again, a transitory status. Households have been getting smaller for a long time and have now fallen below three persons per unit. A substantial part of the change in the past has been due to fewer children in the home and, even earlier still, to the virtual elimination of servants, apprentices, etc. But, in recent years, there has been a rapid increase in one-person households. There was a 40 percent increase in such households from 1970 to 1976, as compared to only an 11 percent increase for multiperson households. Numbers of solitary male households grew by nearly 57 percent over the same period, while other male-headed households increased by only 8 percent. Solitary females increased their numbers as much as female family heads (both by nearly one-third). By contrast, the overall population of adults in their own household increased by only 12 percent during the 6-year period. Much of the disproportionate increase is accounted for by those under 35 years old and with at least a high school diploma. Both the permanence and meaning of this important shift are proper subjects for study, but the phenomenon itself is sufficient to raise questions about dependency patterns that may persist across separate households. When one-person households were a fairly small stable fraction and concentrated among the older population, it posed a minor problem for interpreting data, for instance, on income support patterns; when it is increasing rapidly among the young, it cannot be ignored.

A third behavior trend that may be emerging, and that we

think is increasingly important to note, is the breaking down of the traditional pattern of activities over the life cycle. The breadwinner stereotype has been accompanied by another stereotype that has simplified data collection and analysis but may be introducing increasing distortions—the idea that life progresses from an education stage, through a labor force stage, to a retirement stage where one does not work but rather enjoys leisure.

There is evidence that people would like to spread these three activities more evenly throughout their lives. A sample survey of 791 employees, for instance, came up with the result that 80 percent of workers feel it would be better, both for them personally and for society at large, if education, work, and leisure were interspersed to some degree, rather than following one another in strict, irreversible sequence.

More and better longitudinal data are necessary before we can say anything definitive about what changes are occurring in people's responses to the different passages of life. The evidence we do have, however, combines with the trends already documented of increasing labor force participation on the part of women to suggest that the traditional, orderly progression may indeed be giving way to more flexible patterns.

Let us first look at youth (those 14 to 24 years old). Youth made up 19 percent of the civilian labor force over 14 in 1964 and 25 percent in 1975. This was due to an increase in youth labor force participation over the same period from 45 to 54 percent. This was not, however, at the expense of schooling. Between 1964 and 1975 the proportion of youth enrolled in school increased for both sexes, over the entire 14- to 24-year-old age span. And, the labor force participation of those enrolled in school also increased over the whole age range for both sexes. Between 1964 and 1975, for instance, the labor force participation rate of those enrolled increased from 25 to 29 percent for males and 17 to 26 percent for females in the 14- to 17-year-old age group; from 36 to 42 percent for males and 25 to 41 percent for females in the 18- to 19-year-old age group; and from 48 to 51 percent for males and 38 to 55 percent for females in the 20- to 24-year-old age group.

The second major stage of the life cycle that deserves attention is the midlife stage. As we have already noted, increasing numbers of women of all ages are entering the labor force. Other factors, in our view, are beginning to combine with this trend in such a way that we can expect increasing numbers of men and women to change their working patterns during their prime-age adulthood.

For one thing, when two members of the same family agree that each has the right to pursue a career, compromises are bound to be necessary to the extent that they cannot both pursue their best job opportunities at the same time or in the same place. (Mothers entering the labor market when their children are grown can be regarded as a special case of this general point.) When fewer women worked and when working women were considered the exception, these compromises were included in the women's role—leading to a fairly stable pattern of second best for the secondary earners throughout their adult lives. Expanding job opportunities for women, and the new recognition that both earners should have equal opportunity (if not at the same time, at least one after another), can be expected to result in an increasing proportion of the labor force of both sexes making major employment shifts to accommodate the career needs of their spouses.

There is also increasing evidence that people in their middle

years (particularly now that life expectancies are so high) want or need a major career shift for psychological reasons. If a variety of job experiences during one's working life is a normal good, the increasing incidence of two-earner, two-income families will enable more people to indulge this preference. The expansion of adult education is certainly, at least, in part, a consequence of this trend and can be expected to strengthen it. In October 1976, for instance, 1.6 million persons 35 years old and over were in school. Three-quarters of them were in college, most of the rest were in trade or vocational school, with a small number (4 percent) in elementary or high school. Men and married women each accounted for two-fifths of those enrolled; women without husbands present accounted for the remaining fifth. The labor force participation of all the back-to-schoolers is high—in the 70 to 90 percent range for all groups, except married women, husband present (60 percent), and women 50 years old and over (59 percent).

The final stage in life is old age. The traditional response to old age, of course, is complete retirement. As with the traditional responses to earlier life-cycle stages, responses to this stage may be starting to vary. Longer life expectancies, increasing recognition of the rights of the elderly, and the consequences of the dropping birth rate on the age distribution can all be expected to stimulate such a trend.

It is true that, historically, the labor force participation rates of the elderly have been declining steadily. We do not expect any dramatic reversal in this trend. But, it is clear that the declining birth rate and the financial troubles of the Social Security system will stimulate taxpayers in the younger cohort group to consider changing the work incentive structure facing the elderly in the direction of encouraging work. As the elderly include more and more dual-earner families, policy questions concerning program benefit eligibility for spouses who differ in age and/or health status are also inevitable. Such developments could well lead to increased labor force participation (if not full time, part time or part year) on the part of the elderly men and women in the population.

INADEQUACIES OF THE CURRENT PRESENTATION OF SOCIAL STATISTICS

The picture presented in the last section of the current reality of household formation and re-formation and the allocation of functions associated with home and health suggests that our current conventions for monitoring status are not well suited to the task. Our categories try to fit new forms into old rubrics and perpetuate certain mind sets that tend to obscure or even deceive our perceptions about the situation.

Most prominently, the notion that wives are dependent persons is deeply imbedded in our statistical system. The very concept of head of household relies, for any coherence, on presumptions about undivided household power and authority, and analytic practice has been led in the direction of characterizing the household (and, therefore, all the individuals within it) in terms of its head, noting only the presence or absence of a spouse. We applaud the efforts to abandon these presumptions by dropping the statistical concept of head of household. It is essential to collect statistics in a way that makes possible adequate recognition of widely varying patterns of interdependence among able-bodied adults sharing the responsibilities, work, and pleasures of a joint home environment.

A second major inadequacy in the way social statistics are tabulated and presented is the blurring that occurs with the current usage of family and household. This is not to say that the Census Bureau does not know the difference between familial and nonfamilial relationships within the household. It is to say that current statistical practice does not recognize that important social and economic interdependencies along kinship and marital lines extend beyond the household and do not terminate when a given household dissolves or evolves into a different form or forms. The multifamily household is well recognized but becoming increasingly rare. Multihousehold families are almost certainly becoming increasingly prevalent but are not accessible within the basic data sets we now collect and use.

Impermanence of household structure is a closely related social reality that has yet to be recognized in our social statistics. Longitudinal data have heightened our awareness of the volatility of household membership. This is partly due to marital instability, but it is also the result of less disruptive transitions among living arrangements as persons move through their life cycle in a society which provides increasingly numerous options and permits an increasing disposition and capacity to choose among them, whatever one's demographic status and life-cycle stage.

EMPHASIS ON THE INDIVIDUAL

These problems all point to the importance of orienting our statistics to the basic unit of the individual. This provides a unit of analysis which is indivisible and continuous over a lifetime. Individuals pass through several of many possible statuses during that lifetime—childhood dependency, conjugal relations, parenthood, segments of labor market activity, etc. Household and family connections are important features of these status descriptions, but they cannot describe them permanently or completely. An approach that centers on the individual eliminates the need to treat women differently from men. Both can be equivalently characterized as adult persons with the same capacities for autonomy and contract formation.

This is emphatically not to say that all data presentation or analysis should be sex blind. Situations and alternatives are not identical for men and for women. And social objectives, in our view, are not well served by policies to eradicate all sex-related differences as measured by social statistics. This is too simple a policy prescription. It also makes the task of reforming our data base well nigh impossible in the foreseeable future, because it depends upon a social policy consensus that does not seem imminent. Rather, the appropriate objective is to provide statistics that do not embody any presumptions about the inevitable or right pattern of household or familial relations. Such statistics would provide comparability between men and women so that social policy argument can proceed from a less value-laden set of facts toward policies that serve to harmonize the life courses of all autonomous persons whatever their gender.

The basic cross-sectional data currently collected by the decennial census or the Current Population Surveys can readily be presented in forms that use the individual as the unit of analysis. Certain characteristics of individuals are sufficiently unchangeable (sex, race, and ethnic origin) or sufficiently predictable (age) that they can be used as classification criteria with the confidence that the identified groups contain the

same people from period to period. But, other statuses do change from time to time and should, therefore, be treated as more transitory descriptors of a person's current situation. The family and household of which an individual is a part are two such descriptors. They are measures that refer to the individual's ascribed status within the unit and to that unit's status relative to other units within some agreed-upon comparability classes (which we discuss further in the following section).

For example, the description of a woman's status might include her being a mother in a household with three children at an economic level indexed in terms of a normalized or per-adult equivalent income. Similarly, each child could be characterized in terms of his or her co-residence with one or both parents, the same economic level index, etc.

This sort of reorientation need not await any major reformulation of the basic data-gathering operations. What is needed is a systematic review of the data tabulations to inquire which of those might be more illuminating if presented as tabulations of individuals within units, rather than tabulations simply of aggregations of persons, such as families or households. Clearly, the analysis of birth cohorts, as they progress, would be much facilitated and enriched by these alternative forms of tabulation, and those analysts who have been developing the analysis of birth cohorts could provide a major source of ideas for the form such retabulations should take.

The retabulation of existing data can provide a great deal of useful information on the average experience of major subgroups and of the dispersion within them at a particular time. It cannot, however, provide more than a dim reflection of the amount of transitions from status to status of the individuals in those groups as they work out their lives through time. Clearly, the number of people who are below some income level or the number of children not co-resident with both parents on some Friday in April are poor indicators of the number of persons who will experience such statuses for varying intervals over a longer period of time.

For this, at least some measure of longitudinal information must be introduced. The Panel Study of Income Dynamics has been very useful in helping to break down the deeply ingrained habit of regarding the statuses of poor, female-headed households, or whatever, as relatively permanent situations for the people in them. We now need regular and comprehensive indicators of the duration and cumulative incidence of such life circumstances. There are reasons to hope that the added insight will lead to policy formulation that is more sensitive to the dynamic processes that are being ministered to or interfered.

PRINCIPLES TO GUIDE THE CLASSIFICATION OF PERSONS INTO HOUSEHOLDS AND FAMILIES

From the point of view of social behavior, analysis, and policy, perhaps the two most important elements to be dealt with in any classification scheme are conjugal relationships and parent-child relationships. The complexity of these and the resulting problems of multiperson aggregation have implications for household and family definitions, which are also discussed in this section.

A conjugal relationship can be defined as one in which a man and a woman are living their personal lives jointly. Society has always and will doubtless continue to pay great attention to this category of human relationship—partly because a high

proportion of them produce children and partly, no doubt, because, with or without issue, such relationships relate to the well being of the people involved and, therefore, to the effectiveness with which society satisfies the wants and needs of the individuals within it. We have no quarrel with that.

What needs to be eliminated from the concept, however, is the remnants of woman-as-chattel. Practice, explicit or implicit, that assigns headship always to the man is no longer attractive for either ideological or descriptive purposes. A couple should be regarded by our statistical system as a partnership with presumptively equal authority and stake in the benefits and costs of the partnership. This means that, whatever degree of "oneness" the relationship may have achieved, it is inappropriate (not to mention inaccurate) to use the characteristics of one of the partners as a characterization of the couple.

There are, of course, characteristics of conjugal relationships that can be described and analyzed—the duration of the relationship, the joint responsibilities for biological or adoptive children, joint interest in wealth of all kinds, etc. The explicit recognition of a conjugal relationship as a relationship with variable duration, however, and the fact that an individual may enter several during the course of a life suggest that the accounting for responsibilities and wealth of individuals who are parts of couples should also allow for those components that are separate from the joint enterprise.

The second analytic category of paramount importance to society is the parent-child relationship. This really includes two kinds of patterns—(1) units composed of adults looking after children who live with them (hereafter called parent-child units) and (2) adults with natural or adopted children with whom they do not live (familial ties across households).

The first is the traditionally recognized pattern. As we define it, the concept of child implies those under 18 years old with no requirement of biological (or legal) parenthood. One must also recognize that there are one- and two-parent variants. The important criterion is whether one or two adults occupy parental roles with respect to the children. (In the two-adult case a conjugal relationship between them is implied. Co-resident adult siblings, for example, would not qualify.)

These units are of self-evident importance for their role in the material and human investment that constitutes child-rearing. In that context, it is particularly important to recognize the dependency patterns inherent in the inter-generational aspect of the relationship, which leads us to parent-child relationships that cross living-unit boundaries.

For single-parent units and for remarriages, these dependency patterns extend outside the living unit. We do not now have, and badly need, statistics that can indicate the degree to which these familial relationships give rise to interhousehold transfers (formal and informal, regular and contingent, cash and in-kind). This currently unmeasured, but possibly increasingly important, phenomenon is directly relevant for assessing trends of equality, adequacy, and other issues of economic status. In particular, it is relevant for the special interest of public policy in the peculiar vulnerability of the single-parent living unit.

The clear implication of these lines of argument is the need to distinguish more appropriately, than current practice does, between a household and a family. Household, on the one hand, should refer to the living or domestic unit and, thus, include, in the same household, all persons who are sharing the

full use of a dwelling unit's facilities. Kinship and conjugal relationships are relevant but not central to the categorization of households. The notion of family, on the other hand, no longer matches up well with the directly observable housing or residential units that have been and will continue to be very important for purposes of sampling. Families, although untidily arranged in terms of living units, involve kin relationships and thus do not display the problem of transitoriness we remarked for households. It is not the genealogical ties *per se* that we mean to stress but the active or genuinely contingent responsibilities for support among persons who belong to the same kin, although they live in separate households. These responsibilities are predominantly inter-generational (with the major exception of support to ex-conjugal partners).

A NEW HOUSEHOLD CLASSIFICATION

Households, since they match up, as previously mentioned, with the housing units that are essential to the sampling and administration of surveys, must continue to be the framework within which to collect data on individuals. We, therefore, recommend a revised and more disaggregated classification scheme. Our scheme is virtually exhaustive in that everyone is defined as either a household or a member of one. Current usage also does this. The new emphasis is on the recognition of (a) a wider variety of households that are usefully distinguished and (b) the transitoriness of a person's affiliation with a particular one. We use kinship and conjugal relationships to categorize households, but the classification makes no attempt to make family and household conform.

The classification is as follows:

1. **Single persons.** This includes rent-paying roomers/boarders and occupants of group quarters as sub-categories.
2. **Couples.** These are strictly two-person conjugal units.
3. **Parent-child units.** These are composed of children under 18 years old, parent(s), and older siblings only—
 - a. One parent
 - b. Two parents
4. **Other households that include children² or other related dependents—**
 - a. Three generations
 - b. All others with persons under 18 years old
5. **Related adult units.**
6. **Nonfamilial adult groups.** These are communes, sets of roommates, etc., and may contain couples.
7. **Institutions.** These may be therapeutic, educational, penal, or custodial.

This household typology emphasizes the importance of childrearing units and preserves the identification of the isolated nuclear family (category 3b). But, it does so within a framework that emphasizes the social and economic relations that can be presumed among the members of a co-resident household and also the type of environment provided for each person as a consequence of the other persons in the unit. There is no attempt to define units that can be presumed as permanent. To the contrary, one can well imagine a person

migrating among many of these household statuses during a lifetime. At the same time, it recognizes that an important feature of society lies in the patterns of transition and duration-of-stay distribution for persons with different age, sex, and economic characteristics.

In no category is there an inherent need to designate a head. (Household types that include only one couple do imply primary authority for the pair; similarly, one-adult households confer primary authority on that person.) Our categorization is consistent with the Census Bureau's move to eliminate the arbitrary sex-biased designation of household head and to eradicate the implication that the single-parent family is some sort of aberration by finding a less value-laden phrase than "female-headed household." It also provides a framework for comparisons between the status of women and the status of men within categories that carry similar presumptions about responsibility and authority.

SOME SUGGESTIONS FOR THE COLLECTION OF NEW INFORMATION

In collecting social and demographic statistics, the detailed maternal status of women has long been considered an appropriate survey topic—number of live births, number of living children, their ages, etc. Why should it be impossible or inappropriate to get similar information about the paternity of men? Both parents share responsibility for the support and nurture of children born, and both should be regarded as retaining those rights and obligations, irrespective of any disruption in their conjugal relationship. Males and females alike should be asked about their natural and formally adopted living children under 18 years old, with an accounting for each concerning whether they live with that person, the other parent, other kin, in institutions, or under some other form of care.

The amount of interhousehold support due to responsibilities for children is not well accounted for in the statistics. For all children not co-resident with the parent, the extent of support payments (and alimony to ex-spouses), plus some indication of support obligations not embodied in current payments (emergency needs, future education, etc.) should be ascertained. Similarly, for any child not living with both natural or legally adoptive parents, the resident family should be asked for support payments received on behalf of the child, with comparable queries about additional obligations. Family ties involving economic support between adults also should be explored. Here again, the existence of living parents or adult children could be ascertained for all adults, and the existence of current transfers or potential obligations in either direction could be pursued. We presume transfers or obligations between siblings to be infrequent enough to permit their being ignored.

It is the existence of such actual or contingent material support obligations that leads us to urge consideration of this aspect of family as a distinct concept in our statistical system. The rapid increases in one-person households; reduced household sizes, in general; and the whole instability of household composition suggest that interhousehold obligations along familial lines (which are relatively persistent) is a major factor in understanding what is happening to household structure and, more important, what the implications are for the material well-being or hardship of the persons involved. It seems clear that women typically come out on the short end of the stick in these obligations, but until a fuller set of facts is available,

²Persons under 18 years old are classified as children unless they are parents, members of couples, living alone, or living in an institution.

it will remain impossible to document such assertions adequately to monitor trends in support patterns, to explore impacts on selected groups, or to devise corrective policies that are properly directed.

CONCLUSION

The notions discussed previously represent our attempt to suggest ways in which social and economic statistics related to the household might be brought into conformity with the changed and changing roles and behavior of women and men in American society.

The dominant themes have had to do with the breakdown of the presumption that the breadwinner/mother/dependent-children pattern is an all-but-exclusive description of the way families are, or should be, organized. The recommendations are urged on the basis of our conviction that behavior and career patterns are, in fact, less stereotypic than they were in the past or, at the very least, that Americans are becoming more willing to recognize, tolerate, and even measure the variety of ways in which people live out their lives. We do not regard the household as a unit that has enough constancy of structure to provide a very useful analytic unit. Households are changing composition all the time and, similarly, individuals frequently change the households of which they are members.

The growing importance of separation, divorce, and remarriage is certainly a major contributor to the transitory nature of the household. It is also a major reason for expanding our view of the family to include other households or parts of them within the pattern of substantial economic obligations that derive from the family contract.

Within the constraint of using currently available basic data, it is possible to provide a much wider array of statistics and distributions that use the individual as the unit of analysis. Almost all available measures can be associated with the individual—including, of course, the nature of the household unit the person is currently a part of, along with indicators of economic performance of the individual or the household (allowing for some kind of per adult equivalence). Responsibilities for co-resident dependents can similarly be attributed to individuals, as can obligations to family members outside the household.

Tabulations of individuals without regard to their membership in households of various types could provide very useful contrasts between the situations of men and women, and these could be further broken down to make such comparisons among age, ethnic, or geographic categories. As mentioned earlier, the notion of headship (of a household, family, or even a couple) is on its way out in our statistical system and a great deal more could be done with the concept of the couple recognized as a partnership of two individuals with their own separate and equally important characteristics. Those things that are interesting about the couple status have to do with the processes by which such partnerships are formed and dissolved, the duration of their existence, and their joint productivity and reproductivity.

While it would be possible to display more information about couples, on the basis of currently collected statistics, major improvements in understanding require additional primary data on how productive efforts are allocated and organized within the partnership. So far, we have mainly information about paid work outside the home. More information is needed on productive activities in the home, particularly those involved in the rearing of children.

Parent-child units can be sorted out and analyzed with current data sources, and, for analyzing the human capital of upcoming generations, this is a highly important objective. A major gap that exists here, however, is information on the transfers in and out in cases where both parents are not living with all their joint children. Closer examination of the allocation and maintenance of parental responsibilities between fathers and mothers is of direct importance for a variety of public policies having to do with assuring adequate support for the childrearing function.

Recategorization of household types is an easy task with available statistics. The most important implication of regarding households as transitory and mutable institutions, however, lies in longitudinal data which could provide information on how individuals move among household status categories. One might rely on recall information for transitions that took place in the past, but it would clearly be valuable to have continuing longitudinal samples so that changes in patterns could be perceived, and the determinants of those patterns analyzed on the basis of timely information.

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COMMENTS I

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Reynolds Farley and Suzanne Bianchi overview recent changes in family/household structure and conclude that family organization in the United States has shifted substantially away from the traditional model. Age at first marriage is increasing; divorce-separation statistics are on the rise; we have seen increases in the proportion of female-headed households; and legitimate birth rates have dropped, while illegitimate births have increased. Farley and Bianchi also present data which illustrate the changing relationships of family/household organization to family welfare in this society. Large race/sex differences in income persist; female-headed households continue to lag behind male-headed and joint-headed households in income; and patterns of employment continue to change (e.g., more females in labor force, Black unemployment rates are approaching crisis proportions). What then, one is prompted to ask, is the relationship between these social and economic trends? As our introductory family courses taught us, economic factors underline and, to a great extent, determine structure and process in family systems. So, how exactly do social and economic changes intertwine within American families to determine their patterns of organization? Farley and Bianchi leave this question unresolved and, by so doing, remind us more forcefully of the pressing data needs in our information base on families. Current limitations in data collection and tabulation procedures impede empirical investigation of such questions.

Harold Watts and Felicity Skidmore review many of the same changes in family/household structure as Farley and Bianchi but with one major difference: Their perspective emphasizes the individual. Current data collection/tabulation procedures, they illustrate, are hampered by outdated conceptual frameworks. U.S. families are no longer—indeed, if ever they were—characterized by patriarchal economic systems, nuclear composition, and fixed membership. Rather, more females contribute to the economic maintenance of households; membership patterns vary more widely across (and within the lifespan of) families; and individuals are increasingly patterning their major life events (education, work, and leisure) in less traditional ways. Introductory sociology of the family also taught us that American families are increasingly oriented toward individual fulfillment. So, how effectively are contemporary families facilitating attainment of this goal? Once again, available data prove inadequate to the question; they fail to accurately reflect the sharing of economic functions or the impermanence of household composition which characterizes contemporary family life. We vitally need, they demonstrate, more sensitive, detailed data on individuals within families.

While superficial examination suggests diametric opposition between the papers—one calling for increased statistical

attention to individuals and the other for increased statistical attention to families—more careful perusal of their contents reveals considerable congruence of thought. In both cases, the authors see the necessity for changing (more correctly, modernizing) conceptual frameworks which underlie and guide the collection of census data on families. Both papers also underline the necessity for developing alternative approaches to the tabulation and classification of available data. So, in fact, the papers share a consensus of sorts, albeit, at times obscured. We need better statistical data on both individuals and their families. In conjunction, these papers outline systematic strategies for attaining this end. They differ in that Watts-Skidmore operate from an inductive perspective, i.e., beginning with individuals and moving up to families, while Farley-Bianchi operate from a deductive perspective, i.e., beginning with families and moving down to individuals. By taking individuals as the unit of analysis, as Watts-Skidmore suggest, census data would more effectively represent their diverse characteristics and life situations. Through aggregation of individual statistics collected across more extensive family organizational categories, as Farley-Bianchi propose, census data would more accurately portray the overall socioeconomic welfare of the family as a unitary whole. In short, although the focus of concern varies, both papers insist that static, outmoded models of family life be discarded in favor of dynamic, contemporary ones.

I shall now move beyond my general overview of the papers to a more detailed discussion and consideration of their respective features. During the course of this analysis, particular attention will be paid to features of the two papers which specifically address limitations in the Federal statistical data base on women and propose solutions to such problems. However, my comments will not be restricted solely to these issues. As a matter of convenience, my discussion will be presented in a point-by-point format.

Farley and Bianchi's analysis of household structure, as it relates to Federal statistical needs of women, is essentially demographic in thrust. As such, their demographic analysis [3, p. 33] tends to concentrate attention on the relationships obtaining between demographic variables. In the course of this analysis, the following points for consideration arise:

1. In commenting upon the implicit assumptions made by Government programs about family structure and the need for more research on family, as opposed to individual welfare, Farley and Bianchi identify two fundamental shortcomings of contemporary family research. This research is an issue here because it informs our thinking about the nature of family life, what it is and what it should be. Federal statistical data bases will

continue to be problematic in this respect as long as family researchers remain wedded to conceptual/methodological approaches that focus upon individuals exclusively and do not lend themselves to the holistic study of families [6].

2. Farley and Bianchi's examination of important trends in marital status, household arrangements, fertility and the living circumstances of children is thorough and well presented. I take issue, however, with their often implied, sometimes stated, conclusion that these trends determine family economic welfare, rather than the reverse. Their reasoning on this point is called into question by the very statistics cited. The cause-effect relationship postulated in some of their formulations needs to be reversed; that is, family economic welfare (or lack thereof) influences the trends one observes in family/household structure. Delays in age at first marriage, heightened marital dissolution, increased illegitimacy, and single-parent households ultimately result from economic conditions. To be sure, once such trends assert themselves, they do so, at times, with negative consequences for family economic welfare. But the point is these trends are generated initially by economic factors. In a recent paper, I provide empirical support for this view of family patterns as originating in, rather than engendering, family economic welfare [1]. On this same point, the two major sections of their paper, i.e., household structure and household economic welfare, are not adequately integrated so as to spell out how one informs the other.
3. I am also compelled to challenge, or at the very least qualify, the conclusion that substantial shifts away from traditional patterns of family organization have occurred in the U.S. Insofar as the assumed permanence in these shifts remains a debatable issue, these shifts may well be a function of the series of recessions and economic downturns experienced by our society over the last decade. As such, the observed trends might reverse themselves once that economic picture improves. In conjunction, points 2 and 3 highlight the need for data which will allow researchers to correlate changes in family/household structure with shifts in the socio-political, economic picture for the society. At the same time, that data must be amenable to breakdown by significant subgroup categories, e.g., sex, class, race, region, etc. In this fashion, interested researchers will be better able to more accurately assess the sources and consequences of observed changes in family/household structure.
4. Generally speaking, I was somewhat disappointed by Farley and Bianchi's failure to discuss in greater detail the implications of especially noteworthy statistics for family life. Of course, given space limitations this might not have been feasible; nevertheless, the paper would have greatly benefited from selective detailed discussion of important points. For instance, Farley-Bianchi point to increased "illegitimate" births, single-parent families, and children living with only one parent. Through it all, the reader receives the vague impression that somehow this should be a matter for serious concern, yet they stop short of telling us why explicitly. What is the significance of these facts? Why these particular statistics and not others? In short, the paper fails to

devote sufficient attention to elaboration of the theoretical framework which underlies its presentation and discussion of selected statistics on families. As a result, readers are left to ponder the relationships shared by, for example, high unemployment among the young, the increased incidence of marital dissolution, and more working females. Farley-Bianchi may see no substantial interrelationships between these variables or they may see very complex ones; the point is, we need to be told which is the case and provided with insight into the bases for their conclusion.

5. In the vein of point 4, the following questions raised by Farley and Bianchi seem to require further discussion. How are the widening differences in Black and White male employment related to racial differences in household structure? How has the recent influx of White women into the labor force affected Black female employment (or unemployment) and Black families which generally are more reliant than White families upon female earnings contributions? Conceptually and empirically, how are the concepts household and family best distinguished or those of family wealth vs. income for that matter?

Watts and Skidmore's analysis of household structure as it relates to issues in Federal statistical needs on women is decidedly the more "population studies" [3, p. 33] oriented of the two papers. In the tradition of such analyses, they show a greater concern for the relationship of demographic variables with social, historical, political, and economic factors. Specifically, they make the following points in their analysis:

1. Watts and Skidmore illustrate how the statistical concepts used to describe family and economy have failed to keep pace with societal changes. Borrowing a phrase from Wade Nobles [5], data gatherers were found to be "conceptually incarcerated," that is, locked into rigidified views of family as a husband, wife, two children (older son and daughter) and a dog—no cats please. Since few American families conform to this model, new, more sensitive and aware frameworks for the conceptualization of family life in this society are necessary. Otherwise, Watts and Skidmore's goal of delineating data for the adequate study of the entire structure of work and family life as it affects women, children, and men will continue to be frustrated.
2. Researchers must recognize that the male breadwinner stereotypic family/household structure has been invalidated by increased female employment, marital dissolution and alternative life cycle patterns. Until they do, the tendency noted by the authors to tabulate statistics on females as dependent, nonproductive persons will persist.
3. Interestingly, much of our data on women result indirectly from research on families [4]. So much so that the sociology, demography, history, etc., of families is, at times, assumed to be synonymous with the sociology, demography, and history of women. Such an assumption is obviously incorrect; women, as do men, have existences apart from families. As Watts-Skidmore point out, women are subjects worthy of study in their own right, not only in the context of families, but as individuals also. By the same token, men have more of a

family existence than has been acknowledged by Federal statistics to date. Their fertility histories, illegitimate children, etc., are also of importance.

4. The authors make numerous points in discussing the conceptual blurring which occurs with use of the terms "family" and "household." Current tabulation procedures are shown to deny the reality of contemporary family arrangements. Categorization of family data, by household, obscures household involvements with wider kin and friend networks. Households with multiple families have given way, over time, to families spread across multiple households. Federal statistics need, therefore, to capture this more encompassing view of family structure.
5. In conjunction, broader definitions of family and greater impermanence of households argue for individualization of Federal statistics on household/family structure, the authors tell us. For it is only through taking individuals as the unit of analysis that we can avoid value-laden categorization of the data on household/family structure. I submit such value-laden categorization is unavoidable; however, the authors' suggestion would create data sets amenable to comparative display of normatively determined categories and, thereby, establish the relative advantages and disadvantages of each schema. Taking individuals as the unit of analysis accomplishes the goal of allowing us to follow individuals over their life cycle. As Watts-Skidmore note, now and in the near future, individuals will constitute less volatile, more stable units for research focus than will households. Families of orientation represent even more stable research units, in my opinion, since these familial ties are generally maintained throughout one's life—although household affiliations are frequently changed, e.g., due to maturation and launching, divorce from spouse, regional mobility, etc. Given present methods and conceptual frameworks, however, I am forced to concur with

Watts-Skidmore's conclusion that individuals are the most logical targets of focus for the present. Perhaps future advancements will facilitate a unitary approach to families, at which time my personal preference in statistical emphases would shift from individuals to families (as opposed to and distinct from households).

6. In the interim, Watts-Skidmore's new typology for classification of households represents an excellent alternative to current practices. The typology is similar to the one proposed by Billingsley [2] for the classification of variation in Black family structure. He, like the current authors, grew weary of frameworks which did not fit the diverse reality of the families in question. The Watts-Skidmore typology categorizes families in such a manner as to take kinship, conjugal, social, economic, and household environmental relationships into account. The result is a framework better conforming to observed variations in American family life. Such typologies allow us to maximize our information base on both individuals and family/household units.

I conclude my commentary on these two fine papers with a conciliatory note aimed at two groups of advocate scholars, practitioners, and politicians who incorrectly, at times, view themselves as striving toward contradictory goals. Advocates for individuals (e.g., children, women, men) in families and advocates for families as a unit share a great deal in common. For it is impossible for families to exist without individuals, and rarely do individuals exist without having some familial contacts. In this sense, the data needs for both interest groups are quite comparable. Jointly, these papers demonstrate how the data needs of both perspectives have gone largely unfilled. It now remains for researchers, statisticians, and practitioners to take up the initiative provided by these authors and move in the direction of producing better quality data on family households—their structure and internal processes—as well as on the individuals who live within these households.

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COMMENTS II

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If there is one thing demonstrated by the Watts-Skidmore paper and the Farley-Bianchi paper, it is that the American family isn't what it used to be, even as recently as the time of the last decennial census. What lies back of these changes in household and family structure, as well as the changes themselves, accounts for this conference. Its ostensible focus is on statistical needs relating to women, and since women continue to view their family roles as of primary importance, this conference necessarily must consider trends in family structure. The attempts of the Bureau of the Census to better take into account these changes in its data collection procedures have direct implications for family policy. Family policy, in turn, as indicated by the number of conferences and seminars devoted to it, has become, to use Gilbert Steiner's phrase, "the topic of the year, and, perhaps, even the decade."¹ Family policy concern, like this conference, is an outgrowth of changing roles of women, documented by the Census Bureau and other governmental data-gathering agencies.

Households and families (and the two units continue to show a tremendous overlap in membership) are the fundamental mechanisms for the redistribution of income or earnings, as Farley and Bianchi point out. Family wage earners provide for other family members whose financial dependency rests upon their peripheral connection to the labor market. Family policy at the Federal Government level comes into the picture through the Government's commitment to insure a minimum level of economic support for families. It has met this commitment, according to Farley and Bianchi, by trying to minimize unemployment and making transfer payments in cash and kind, as well as more recently by attacking job discrimination.

The central issue of family changes, as far as policy is concerned, is: To what extent do these changes in private behaviors have public consequences? In terms of the Government's economic support commitment, it is: To what extent will economic obligations customarily assumed by families have to be taken over by the Government? Census Bureau monitoring of changes in household structures can provide a gauge for determining which ones are going to have governmental policy repercussions.

The changes to watch most closely are those associated with economic dependency, i.e., household units that include children. As far as Government funding is concerned, one can pretty much define family policy as parent(s)-children policy.

¹ Steiner's remark, as well as the analysis of family policy presented here, are an outgrowth of the Notre Dame International Seminar on Family Policy, held on March 16-17, 1978.

Increases in divorce and illegitimacy rates, for example, because they result in more single-parent households, are prime family policy indicators. As Farley and Bianchi have documented the situation, these increases, by and large, are hard on women. Incomes in mother-headed households are substantially lower than incomes in husband-wife households, even though the average number of children per family has risen in the former and fallen in the latter. There are, moreover, fewer "other adults" present to make financial contributions than in the past in families where mothers are heads. The Government, consequently, has had to step in and assume the usual private responsibility of family income provision. Changes in private behavior have had public consequences by requiring heavier governmental expenditures on welfare.

My discussion will focus on suggestions for Government statistics relating to women that have family policy implications. I will draw upon the individual life course perspective highlighted by Watts and Skidmore, as well as the family development framework to organize the material. Both encompass a longitudinal approach. They emphasize the existence of individuals and families over time, from birth to death in the case of individuals [5] and from formation to dissolution, in the case of families [1]. The study of successive cohorts of women, using this approach, to establish trends in ages at marriage, childbearing and the appearance and duration of a postparental period was pioneered at the Census Bureau [8;9]. Today, the emphasis is on the interdependence of the series of "histories" family members create through functioning as students and jobholders, as well as parents, spouses, and siblings. These histories can be thought of as a series of careers, since each entails a sequence of fairly expectable events following a set of rough timetables. We have childbearing, childrearing, and childlaunching in the parental career, entering and graduating from particular levels of school in the student career, and entering and eventually retiring from the labor force in the occupational career. As we shall see later, these careers may be more or less synchronized.

Watts and Skidmore argue that current household and family membership statuses of individuals are too transitory to serve as analytical units for data collection, and they declare that individuals are preferable units. The family, however, appears to be too durable an institution to be so easily dismissed, particularly where family policy is concerned. It is individuals in their roles as family members that are the focus of attention. The importance of data on marital stability for predicting governmental welfare payments has already been discussed. Parental careers, once embarked upon, in contrast to marriages, tend to be continuous for women. The mother-child household unit endures, although the occupant of the

husband-father position and the economic support he provides fluctuate or may be completely lacking.

Shifts in marital status and household composition necessitate data on economic support strategies of women with children who do not maintain the same spousal relationship over time or have never had such a relationship. The latter group includes families with children formerly in cohabiting households, an interesting group since legal obligations in such families are only now being spelled out in the judicial process. But, where family policy is concerned, it is single-parent families receiving Aid to Families with Dependent Children and the duration of this aid that are most on the public mind. A recent report [12] suggests that only about one-fourth of the women enrolled in AFDC at any one time have been receiving these transfer payments for over 5 years. In order to clarify governmental economic support responsibilities, however, we need data on governmental assistance other than AFDC—subsidized housing, food stamps, etc.—which families receive and how receiving other assistance is related to their joining and leaving the AFDC program. Information on single-parent families' economic well-being, to be complete, must include interhousehold payments in the form of child support or alimony payments and their duration, as Watts and Skidmore note. Since not all eligible women are recipients of governmental services, questions that household data can answer are who these women are and whether interhousehold transfers enable them to maintain their family units. Also useful for family policy purposes, as Watts and Skidmore point out, would be information on how interhousehold and governmental payments for children not living with their natural or adoptive parents interrelate to affect the duration of and obligations assumed by these quasi-family units. In such instances, selective governmental aid may enable private units to fulfill the major share of financial responsibilities that otherwise would become public concerns.

The intermeshing of women's participation in school and workplace with their family careers is also critical for family policy issues. The Census Bureau might well borrow the family development concept of "limited linkage" in instituting new criteria for collecting relevant data [1]. This concept refers to the limitations which prior life events place on current options. Previous small-scale research studies have indicated that women's educational careers, labor force participation, and their families' accumulation of economic assets are limited by fertility decisions [6; 7]. Census data would help to pinpoint when and what numbers of children prove points of no return for women's continuance in school, labor force, or marital careers, careers that contribute to their independence from governmental financial assistance.

We might almost think of women's participation in these various arenas in graphic terms. The arenas would be located along a vertical axis with individual role transitions along the horizontal axis (c.f., [11]). Events in one arena, such as divorcing in the marital career, for example, would show up as a "blip" which could be related to a "blip" in another arena, such as getting a job or going on welfare.

In determining the relationship of special training programs for single mothers and their subsequent labor force participation or the effect of governmental antijob discrimination initiatives on women's employment histories, data must include the number and ages of their children. The same caveat holds true for data on governmental transfer payments and single mothers' school attendance. Even if jobs are available, and they have the requisite training, women may be prevented by too many young children and too few child caretakers from becoming part of the labor force. Thus, parental, educational, and occupational histories may be more or less synchronized in terms of women's having few enough or old enough children, and the necessary schooling to make holding a job possible. And, if there is not sufficient synchronization, the government necessarily will have to step in with financial aid.

The effect of resumption of the marital career through remarriage and its timing on economic strategies, as well as the duration of these remarriages, has implications for family policy. Husband-wife units tend to be more financially independent, as noted earlier, and, at present, there is mixed evidence on the relation of amount of welfare payments and remarriage rates [3; 4; 13]. How the presence of his and her children and the children's ages, as well as economic resources, appear to be related to the occurrence and stability of remarriages is another example of "limited linkages" that the kinds of longitudinal data called for here would clarify to the benefit of governmental family support projections.

We should also not ignore the effect of transfer payments on employment and marital stability when the transfer payments are directed to two-parent families. The recent income maintenance experiments did not consistently show a negative relation between a governmental support cushion and divorce [2; 10]. Census data could show whether there is a critical point of family income and asset accumulation beyond which divorce rates do show pronounced increases, as well as drops.

These are some of the longitudinal data suggestions relevant to family policy culled, in part, from the Farley-Bianchi and Watts-Skidmore papers and organized in terms of individual and family histories. Family policy has been examined here in terms of parent-child units' inability to carry out economic activities privately, which public agencies must, thereupon, step in to fulfill. The timing, as well as the duration and extent of governmental intervention, is changing, along with changes in families and household structures. Inasmuch as women continue to be the more stable members of parent-child residential units, census statistics that center on their family careers as they shift in and out of school and workplace as well as marriage, are critical for documenting the changing state of the family. What I am advocating is the Census Bureau's consciously assuming an additional role—that of insuring that policymakers dealing with family dependency have the kinds of data necessary to know what households they are dealing with now and are likely to be dealing with in the future, as well as for how long in the family careers governmental economic services are needed.

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POSTSCRIPT

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Discussion at the conference has shown that our position concerning the importance of the family as a social unit has been misunderstood. This postscript is to set the record straight.

We are not against the family as a social institution, and we are not against the family as an appropriate subject for study. On the contrary, we are convinced that the family is a crucial social institution. It is precisely because we recognize the cardinal importance of the family in the rearing of children (the development of the human capital of the next generation is the way economists would put it) that we are urging changes in the way our social statistics are gathered and tabulated.

Until we stop using the stereotypical family as our framework, and until we collect statistics that enable us to find out about the diverse sizes, shapes, and characters of families today, we will be in no position to formulate informed hypotheses about family behavior, test them, and use the results as guides to effective public policy.

As our paper points out, family characteristics, though they endure through time, stretch across household lines. This makes them intractable as the primary unit for survey data collection. The household unit is commensurate with the dwelling unit and is, therefore, important both for sampling and as the unit that pools production and consumption activities. The household is, however, ephemeral in the sense that its composition and functional organization change from one time period to another. This is not such a handicap for cross-sectional analysis, but it is very troublesome for longitudinal studies.

The individual who, with other individuals, goes to make up the families and the households is the unit with the necessary

identity and continuity through time. This fact combines with the need to give men and women equal status statistically, as well as socially, to argue for the need to start with individual behavior in our efforts to understand when, why, and how the nature of the household and family units—that are so critically important for delineating the status of an individual at any particular time—changes over time.

Our paper, in addition to the need to study data on the individual in order to understand family and household behavior, also stressed that the distinction between household and family should be made more systematically and defensibly than it has been in the past. The data identified as family data in census tabulations refer only to the co-resident family which is, as it always has been, an incomplete account of familial relations. If we are really interested in how families function as mutual support institutions, we must abandon the fiction that families are contained in single households.

Clearly, a great deal could be done with currently collected census data, both by reformatting the tabulations that are published on a regular basis, and by encouraging users of the public use census data files to focus on the individual within the family and household unit. Improving the longitudinal nature of the data can be done in various stages. Augmenting the current CPS design to follow those who have moved out during the year could provide useful 1-year transitions; panels that rotate only after longer periods could be compiled over time, building upon the experience of current panel studies. The task of gaining information on families that extend across households is a more formidable undertaking and suggests the need for careful design and pretest research.





VI.
Education



EDUCATION: INTRODUCTION

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Education is, undoubtedly, one of the most important areas for discussion at this conference for, I would suspect, there are few of us in this room who would disagree with the premise that education, by and large, holds an essential key to equity, upward mobility, and the elimination of undesirable sex differences. So, in the sense of examining real differences of opinion, one might speculate that there are no major unresolved issues concerning the equality of women, whether this be in education, vocation, or culture. The remaining

problems are simply to discover and reveal areas of unequal treatment. The issues are how do you do this most economically and efficiently (cost effectively). Today we want to discuss the needs, gaps, and deficiencies in Federal data collection efforts in the education field. Once these are identified, it would appear that the problem before us is to determine whether better coordination will enhance the data base or whether the overriding difficulty is priority setting or inadequate resources to cover lower priorities.

DATA PERTAINING TO THE EDUCATION OF WOMEN: A CHALLENGE TO THE FEDERAL GOVERNMENT

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The Federal Government's role in the collection and dissemination of data concerning the education of women can be viewed from several perspectives. A comparatively narrow approach is simply to review current data collection and dissemination activities and make suggestions for improvements. A somewhat broader approach would be to identify some of the major issues concerning the education of women and to evaluate public and private data gathering in light of these issues. In developing this paper, I have opted for this broader perspective for several reasons. First, gaps or deficiencies in current Federal efforts frequently reflect a rather limited conception of the major issues in women's education. Second, important problem areas are frequently overlooked because different Federal agencies fail to coordinate their respective efforts. Finally, since Federal activities are frequently duplicative of (or even competitive with) efforts in the private sector, a more efficacious use of limited Federal funds requires a better understanding of the total national data picture.

This paper is organized into two major sections: Data requirements relating to school personnel and data requirements relating to women's educational development. Within each of these two broader sections, postsecondary education and elementary and secondary education will be considered separately.

ACADEMIC PERSONNEL

Since the professional persons who staff our schools and colleges frequently serve as role models for the students they serve, sex-role stereotyping among teachers and administrators, at different levels of education, represents a potentially serious problem. The young girl's first experience with formal education—nursery school and kindergarten—typically exposes her to women rather than men teachers. As she moves up through the elementary grades, the proportion of male teachers increases, but these increases frequently occur disproportionately in traditionally male fields like science, mathematics, and technology. Additional increases in the proportions of male teachers occur in the secondary school years, although sex stereotyping, by field, remains. At the collegiate level, women instructors are a distinct minority, and they tend to occupy the lower professorial ranks. School and college administrators at all levels are predominantly male, with the top positions at the most prestigious universities being occupied almost exclusively by men. Clearly, continuous assessment of the sex distribution of academic personnel, at various levels, should be a major Federal priority.

Postsecondary Personnel

Issues pertaining to the sex of academic personnel at the postsecondary level have focused heavily on college faculties. With the exception of a few fields, such as nursing and home economics, academic departments have traditionally been dominated by men. In those departments that employ relatively large proportions of women, the women tend to be concentrated disproportionately in the lower academic ranks and in nonladder positions, such as instructor, lecturer, and research associate. Although colleges have been subjected to a considerable amount of internal and external pressure to expand career opportunities for women via affirmative action efforts in recruitment, as yet, no Federal mechanism exists for monitoring changes in sex distribution of newly hired faculty. Consequently, serious consideration should be given to the establishment in the Federal Government of a regular survey mechanism to monitor the recruitment and promotion of college faculty. The mechanism should be designed to produce tabulations of faculty sex distributions, by rank.

The Federal agency with prime responsibility for collecting educational data at the postsecondary level is the National Center for Education Statistics (NCES). Their principal vehicle for collecting such information is the Higher Education General Information Survey (HEGIS), which annually surveys all accredited colleges and universities throughout the United States. Recently, HEGIS has incorporated data which the American Association of University Professors (AAUP) utilizes in its annual assessment of faculty salary levels, by sex and rank. AAUP tabulations of these data provide an excellent basis for monitoring the impact of affirmative action efforts by showing changes in faculty compensation, by sex.

A comprehensive analysis of issues relating to sexual equity on college faculties requires considerably more complex data than simple tabulations of men and women faculty, by rank and salary. Given that many college faculty are hired or promoted on the basis of specific performance indicators, a more definitive test of the existence of sex bias requires that one control for possible sex differences in prior qualifications. Three major studies of this issue (see [6; 8; 9]) suggest that sex differences in faculty salaries cannot be attributed solely to background qualifications, such as institution of highest degree, field of study, and number of publications. Sophisticated research of this type provides much more convincing evidence of sex bias than mere tabulations of male and female faculty, by rank and salary status. Data for such analyses have come from national surveys of individual faculty members, funded by the Federal Government. Each survey, however,

has been funded on an ad hoc basis; no permanent mechanism exists for reexamining these issues in the future. Surveying individual faculty members can, of course, be much more expensive than institutional surveys in which the institutions bear the burden of aggregating the relevant statistics. Nevertheless, given the many uses to which individual faculty survey data can be put, the Federal Government should give serious consideration to instituting periodic sample surveys of individual faculty members. If such surveys were longitudinal, it would be possible to follow changes in the status of individual faculty members and to examine factors such as promotion, acquisition of tenure, and faculty migration.

The obvious need for periodic surveys of college faculty raises a more general methodological issue concerning how survey data are tabulated. Federal agencies have traditionally assessed the progress of affirmative action efforts by reporting sex distributions of all members of the particular population (e.g., students, faculty) in question. As far as college faculties are concerned, such tabulations provide a relatively insensitive measure of the impact of affirmative action efforts. Given the realities of tenure and the fixed pay scales under which many college faculties operate, affirmative action efforts are most likely to have an impact on new hires and promotions. Thus, if a particular college has been unusually successful in hiring and promoting women faculty members, the apparent effects of these efforts will be diluted if the tabulations combine newly hired and newly promoted faculty with incumbents. In short, it is strongly recommended that AAUP or NCES prepare separate tabulations for newly promoted and newly hired faculty. (A similar argument can be made on the matter of student enrollment tabulations; see the following.)

A more subtle policy issue concerning faculty pay concerns differences among institutions. Since women faculty are not equally distributed among different types of postsecondary institutions [6], women may receive lower salaries, in part, because of where they work. In other words, do institutions that employ higher proportions of women faculty pay their faculties less? Are these differences the result of sex discrimination, or are other factors involved, such as the curricular emphasis or the degree of institutional selectivity or prestige? The potential importance of institutional differences can be illustrated simply: Assume that a higher educational system comprises only two institutions. Although one pays much higher salaries, both are scrupulously nondiscriminatory, so that men and women faculty within each are paid equally. If both institutions have equivalent ratios of men to women faculty, the differences in institutional pay scales are inconsequential as far as sex discrimination is concerned. However, if the institution with the lower salary scale employs proportionately more women than the one with the higher scale, a sex differential in salaries for the total system will occur. In short, even if individual institutions do not practice sex discrimination, institutional differences in pay scales can produce de facto differences in faculty pay, based on sex. A recent analysis which combined AAUP salary data with HEGIS data [10] suggests that there are substantial pay differences related to the sex ratio of the faculty. Multivariate analyses that control other institutional factors do not eliminate these pay differences. These results suggest the need for regular monitoring of faculty pay scales among institutions with faculties differing in sex composition.

The vigorous affirmative action efforts that have been directed at college faculties have tended to obscure what may

be a much more critical problem: The poor representation of women in college administrations. Even though many top administrative posts that were formerly filled on an informal basis are now openly advertised and presumably open to any applicant, a casual look at the makeup of most college administrations reveals that this is still a male-dominated field. As of May 1977, only about one percent of all presidents at 4-year colleges and public and private universities were women. Of the three women presidents (out of 309 surveyed), two presided over institutions that formerly were exclusively or primarily for women. Until the recent appointment of a woman president of the University of Chicago, none of the 65 private universities in the United States had been headed by a woman.

Do these data constitute evidence of outright sex discrimination in the recruitment of college and university presidents? Although it is difficult to provide a definitive answer to this question, given the complex and somewhat unpredictable nature of the recruitment process for administrators, a partial answer may lie in the pool of candidates from whom college presidents are usually selected. Although presidential candidates may come from a variety of positions, the most frequent steps on the academic administration career ladder are probably the chief academic officer and the dean of the college of arts and sciences. Aspirants to college presidencies are frequently advised to seek either of these posts as a step toward their ultimate goal. An analysis of HEGIS data on the sex of college administrators [1] shows clearly that women are grossly underrepresented in these two positions. Since high-level academic administrators are typically chosen from the ranks of faculty, one might expect to find proportionate representations of women in such positions. However, if one uses the percentage of women on the faculty as a guide, women are underrepresented as chief academic officers by a factor of 10 to 1 in 2-year colleges and by a factor of more than 20 to 1 in public 4-year colleges.

One consequence of sex discrimination in hiring top administrators is that students of both sexes who enter college for the first time are exposed to a male-dominated and male-oriented administration. The absence of women in top administration can create an environment that lacks not only role models for women who might ultimately become administrators, but also the unique perspective that women might bring to the varied tasks of administering a college. A further analysis of HEGIS data on college enrollments [1] indicates that 19 out of every 20 new college freshmen attend an institution in which the top two administrators are men.

An examination of the sex composition of lower level administrators, again relying on HEGIS data, shows somewhat higher proportions of women, although the proportion in any particular position appears to be inversely related to the status of that position as revealed in median salary levels. Thus, 7 of the 8 lowest paying nonacademic administrative positions include the highest proportion of women incumbents (more than 15 percent), whereas all of the 6 highest paying positions have fewer than 15 percent of women [1].

These findings make it clear that statistics on women in administrative positions can be very misleading unless the specific position is identified and separate tabulations are provided by position. A simple tabulation of sex ratios for administrators would be of very little use in assessing progress toward affirmative action goals. Furthermore, separate tabulations should be provided for newly hired administrators.

Why are women so underrepresented in top administrative posts? Several factors are probably operative: Traditionally, search committees for top positions in academic administration are dominated by older male faculty members, many of whom are unlikely to take any woman candidate seriously. At the same time, many talented women faculty members may not have devoted the same effort as their male colleagues to making themselves visible to search committees. Still another potential obstacle is the criteria used for selection. Most search committees give considerable weight to prior administrative experience or even high-level administrative experience. Since many potential women candidates lack such experience, they may not be considered seriously by committees or, if such criteria are included in the position announcement, may never become candidates in the first place.

These issues underscore the need for continuing NCES data collection efforts, related to the sex of college administrators. Assuming that NCES sustains its commitment in this area, the problem of appropriate analysis of data still remains. We cannot assume that the initiative will be taken by some outside organization without Federal sponsorship or support. In other words, continuing to collect data on the sex composition of college administrations is not enough: The Federal Government should also support analyses and dissemination of results. In this regard, special attention should be given to tabulating sex distributions in those administrative positions that normally lead to top administrative posts in academic institutions.

Elementary and Secondary School Personnel

Affirmative action efforts directed at elementary and secondary school personnel have been much less visible than those directed at postsecondary personnel. There are probably several reasons for this discrepancy. To begin with, elementary and secondary faculties include much larger proportions of women than do postsecondary faculties. Furthermore, hiring practices for new school teachers are generally more public and, therefore, less susceptible to the influence of sex bias on the part of the persons doing the hiring. Finally, the hiring and promotion of school teachers are more often based on experience and seniority than on individual judgments made by teams of peers.

These observations are not meant to suggest that no problem of sexual equity exists in the hiring of school teachers. Indeed, a recent longitudinal study of new college graduates taking jobs as school teachers immediately after completing the baccalaureate provides strong evidence of possible sex bias [2]. After controlling for students' personal background (ability, family income, education, etc.) and educational experience (undergraduate grades, type of college attended, etc.), women take jobs in school teaching that pay approximately \$1,100 less than the jobs taken by men. Why women should receive lower salaries than men with comparable characteristics is not entirely clear. One explanation is outright sex discrimination: Businesses and schools may be less willing to pay women comparable salaries. Another possibility is that women may be more willing to settle for lower salaries, particularly if their mobility is restricted by their husbands' careers. Or, women may seek lower paying jobs. (Men, for example, may be more likely to seek teaching jobs in the higher paying schools—secondary versus elementary, for

example.) Whatever the explanation, this large discrepancy in the starting salaries of women and men merits much more intensive study to assess the relative importance of motivation, sex discrimination, and other factors.

These results suggest the need to focus Federal attention on the issue of hiring and promoting school teachers. Monitoring the sex composition of newly hired school teachers would not be sufficient. Rather, what is needed is much more intensive data on newly hired or newly promoted teachers to assess the possible presence of sex bias. These data, which would ideally be obtained on a regular basis, could involve a sampling of newly hired teachers which would include intensive background and interview data. The sample need not be especially large, although the data collection should be designed so that various alternative explanations of salary differences can be tested.

Very little is currently known about the sex composition of secondary school administrators and superintendents, and even less is known about the factors influencing the selection of persons for such positions. One's superficial impression is that men occupy administrative positions in elementary and secondary education far in excess of their representation in the ranks of the school teachers. In certain respects, the situation here parallels that for postsecondary education, although much less is known about the sex of persons occupying various types of administrative positions in elementary and secondary schools. Under these circumstances, it would be useful to initiate periodic sample surveys of elementary and secondary school administrators. NCES appears to be the most appropriate agency to undertake such surveys.

WOMEN'S EDUCATIONAL DEVELOPMENT

Data requirements for a comprehensive assessment of the educational status of women are far more complex than requirements for monitoring affirmative action efforts with academic personnel. Such data need to address at least two issues: Women's educational progress (e.g., degrees obtained) and women's educational experiences (i.e., characteristics of educational programs to which women are exposed).

Critical policy areas in the postsecondary educational development of women include the flows of women into the postsecondary system, women's undergraduate and graduate fields of study, levels of education attained (highest degrees), persistence rates, recurrent and continuing education, and the quality of postsecondary educational experiences.

Information on the flows of women through the educational system is important for several reasons. First, women have traditionally been underrepresented among entering college freshmen, in spite of their superior academic performance in secondary school. In recent years, however, postsecondary access rates for women have increased while those for men have decreased slightly. Postsecondary education is, of course, a critical factor in later occupational attainment [11]. Second, women have traditionally been underrepresented in fields of study that normally lead to high-level and high-paying careers in scientific research, law, medicine, and business. Increased enrollments of women in majors leading to such occupations would presumably constitute evidence that career opportunities for women are expanding.

Postsecondary Development

The Federal Government has already established substantial data collection capabilities in the area of women's postsecondary educational development. These mechanisms include the HEGIS of NCES and the October (education) Current Population Survey (CPS) of the Census Bureau. NCES's *Opening Fall Enrollment* and *Earned Degrees* report detailed tabulations, by sex, of enrollments in different types of institutions and of fields in which various undergraduate and graduate degrees are awarded. However, for purposes of monitoring the postsecondary educational progress of women, several changes in the format in these publications would seem to be warranted. Specifically, it would be useful if the annual reports of these surveys included 10 or 15 year trends in enrollments and degrees awarded separately for men and women. Fall enrollment figures would be especially useful if such trends were reported for first-time, full-time students. To provide approximations to access rates, it might be useful to express such figures as a percentage of the total number of male and female high school graduates of the same year. Another useful change would be to aggregate the data on specific degree fields into somewhat broader categories (arts, humanities, social sciences, natural sciences, etc.). Annual trend analyses of these more aggregated fields would provide a much simpler means for assessing trends in women's fields of study. A final suggestion would be to aggregate enrollment and degree data, by type and quality of institution. Since women have traditionally been concentrated in the institutions of lesser prestige and quality (as measured, for example, by the selectivity or average academic ability of the entering class), an increase in postsecondary access rates for women would have a different meaning if that increase were limited primarily to institutions of lower quality.

In the 1976 HEGIS survey, NCES attempted to collect information on undergraduate enrollments, by field of study. The principal obstacle to such efforts is the fact that many institutions do not require students to declare majors until their second or third undergraduate year. However, our experience at UCLA with 13 years of sample surveys of individual freshmen [3] indicates that 95 percent of the freshmen are able to declare a probable major at the time of matriculation. Although more than half of these students will end up in a different major, the changes from probable to final major are highly systematic, such that, in all aggregate, the final distribution of majors can be estimated with some precision from the earlier distribution of probable majors [5].

Recent surveys of entering freshmen from the Cooperative Institutional Research Program (CIRP) show dramatic changes in the career plans and degree plans of women entering college. Since the late 1960's, women have shown a steadily increasing interest in four occupations traditionally dominated by men: Business, medicine, engineering, and law. Men's interest in these same occupations has either remained stable or declined slightly during the same period of time. Ten years ago, women accounted for only one in nine students planning to enter these four occupations; by 1978, they accounted for more than one in three. The increase began in 1969 and 1970, about the same time that the women's movement gained momentum. These increases are still accelerating. In just 9 years since 1969, they have been impressive in all four fields; the percentage of entering women freshmen planning to enter business has

quadrupled (from 4 percent to 16 percent), the percentage planning to become doctors has more than doubled (from 1.3 percent to 3.4 percent), the percentage planning to become lawyers has quadrupled (from 0.8 percent to 3.4 percent), and the percentage planning to become engineers has increased sevenfold (from 0.3 percent to 2.2 percent).

Although followup studies indicate that women are somewhat more likely than men to drop out of these fields during the undergraduate years [2: 5], these dramatic changes in career preferences of entering college women may ultimately have a profound effect on the labor force in general and on these four professions in particular. Increasing the number of women lawyers will, in addition, expand the base of women candidates qualified for public office and the judiciary.

The usefulness of the CIRP data as a kind of social indicator that assesses societal changes in the aspirations and roles of women suggests that a Federal survey mechanism for monitoring flows of women newly entering different postsecondary levels (freshmen, graduate, etc.) would be extremely useful. Having detailed survey data on individual students, in addition, would make possible a great many more sophisticated analyses than are possible when information is collected from institutions in the aggregate. (This point will be discussed in more detail in the concluding section of the paper.)

Perhaps the best mechanism for monitoring women's access to postsecondary education is the October CPS of the Census Bureau. Although some very useful trend information on postsecondary access has recently been released by the Census Bureau [12], the analytic capabilities of the CPS data have not yet been fully exploited. One very useful tabulation, for example, would show trends in first-time entering students among new high school graduates. Since family income may be a more important determinant of postsecondary access among women than among men [7], it would be especially useful if such tabulations could be performed separately, by family income level. The relatively small size of the CPS sample, however, obviously limits the number of such breakdowns that are possible.

There is currently very little Federal capability to monitor trends in women's postsecondary programs and experiences. Nevertheless, the annual HEGIS survey would be a useful mechanism for collecting such information. It would be useful, for example, to monitor changes in the number of institutions offering programs in women's studies and possibly in the enrollments of men and women in women's studies courses. HEGIS could also be used to collect information on the number, size, and scope of women's centers, gynecological facilities, and day-care centers.

One area that has received little attention so far in Federal data gathering activities is so-called adult education. At this conference, Steve Sandell of Ohio State University pointed out that data requirements for adults returning to postsecondary education involve certain types of information (marital status and number of children, for example) not normally collected from 18-year-olds.

Many of the most critical issues concerning the postsecondary educational development of women can be resolved only through longitudinal data. NCES has, of course, conducted the National Longitudinal Study (NLS) and is planning a similar study to begin in 1980. Since these surveys are focused on the secondary rather than postsecondary level,

the usefulness of the data for studying postsecondary education is somewhat limited. If a regular Federal capability for longitudinal studies at the postsecondary level were instituted, it would be possible to study more complex issues such as the impact of financial aid programs and the effectiveness of guidance and counseling.

Elementary and Secondary Development

Federal capability for monitoring the educational development of women is much more limited at the elementary and secondary levels than it is at the postsecondary level. Of the many educational problems and challenges confronting girls of elementary or secondary age, few are as significant as the development of interest and skill in mathematics. Nationally standardized tests show clearly that, by the time they reach the secondary level, girls are performing substantially below boys in mathematical achievement. This relatively low level of performance no doubt conditions the young women's subsequent education and career development: It affects decisions about whether or not to attend college, which types of college to attend, what courses of study to undertake, and, ultimately, what career to pursue. Closely associated with mathematical skills is the development of interest in science and technology. Although somewhat larger proportions of women these days appear to be pursuing postsecondary work in science and technology, their representation in these fields is still far below that of men.

From a broader perspective, furthering the educational development of women requires a greater understanding of the factors that influence skill development in many different fields. What early developmental experiences contribute to the development of particular interests and skills in the preschool girl? How does the development of particular skills influence the young woman's self-concept? Although these are clearly questions of critical concern to women's educational development, it is not clear just what the Federal Government's role in monitoring these developmental trends should be. An adequate exploration of these questions would clearly involve longitudinal studies beginning at an early point, perhaps in the preschool years. Should the Federal Government consider establishing regular sample surveys of different age cohorts? Which agencies should carry the main responsibility for conducting such research? How is the funding for such activities to be secured? Although these policy questions are too complex to explore in this paper, the importance of these developmental issues suggests that agencies of the Federal Government should give serious consideration to the establishment of regular surveys of educational development across a spectrum of ages.

Various Federal agencies have periodically conducted sample surveys of elementary and secondary school programs and policies, although no regular survey mechanism of this type has yet been established. It would be important, for example, to assess trends in the type and amount of guidance and counseling provided to students in the elementary and secondary grades. Are young girls steered away from traditionally masculine fields and into traditionally feminine courses? What kinds of career advice do young women receive as they begin to plan for their postsecondary education? What kinds of information about financial aid opportunities do they receive?¹

In her critique of an earlier draft of this paper, Mary Powers

of Fordham University suggested that surveys of secondary school policies and programs should focus on three areas that directly affect educational equity for women: (1) Admission to vocational programs, (2) enrollment in specific courses such as home arts and industrial arts, and (3) participation in athletics and other extracurricular activities. Monitoring changes in such activities would provide an important basis for evaluating secondary school programs and policies. HEW's Office of Civil Rights has recently undertaken surveys which examine some of these issues. Regular monitoring will become a reality, of course, if such surveys become a regular activity rather than ad hoc efforts.

Another area of considerable significance in women's educational development is vocational education. Vocational education programs have traditionally been highly sex stereotyped, with women frequently being discouraged from entering many technical fields. A promising sign of greater Federal concern for better data in this field is the proposed national Vocational Education Data System (VEDS), which will shortly be initiated by NCES. VEDS will eventually incorporate systematic national data on students, programs, program completors and leavers, staff, facilities, and expenditures. It is hoped, of course, that NCES will routinely report all student and staff data tabulations from VEDS separately by sex.

TECHNIQUES OF DATA COLLECTION

This paper has suggested a number of areas in which Federal data-gathering activities could be modified or expanded to provide more useful information concerning the educational development of women. If the Federal Government decided to move in any of the directions suggested in this paper, serious consideration should be given to the issue of how statistical data are collected. An analysis of current data collection activities suggests that there are three basically different methods of data collection currently being used by the Federal Government: Institutional surveys, informant and self-reports. Each method has advantages and disadvantages.

Institutional Surveys

The method most commonly used by NCES and OCR to collect educational data involves asking institutions to provide summary tabulations of particular data. This method permits one to design an institutional sample and, presumably, collect data reflecting the status of all enrolled students. The major difficulty with the method, of course, is that it relies on the individual skills and conscientiousness of those institutional personnel who bear the responsibility for supplying the aggregated information. It is, thus, difficult to verify the accuracy of the data provided. Institutions use highly diverse methods to collect data, and it is difficult to assess the accuracy of certain methods. Institutional surveys are, however, a relatively inexpensive way to obtain a great deal of aggregated information from a sample or population of institutions.

¹ A recent NCES-supported review of the literature in sex discrimination in access to postsecondary education [7] shows that high school girls are more likely than boys to perceive the costs of postsecondary education as a barrier.

Informants

The CPS of the Bureau of the Census relies on informants to provide information about the sampled households. While their method has the advantage of permitting direct interaction between the data collector and the respondent, it has several potential disadvantages. The method assumes that the informant has sufficient information about the educational status of those household member(s) in question, such as enrollment status (full time, part time, or dropped out) and the type of institution (public or private, proprietary or traditional, etc.). The household informant method also runs the risk that certain classes of respondents (low income persons, for example) may be inclined systematically to exaggerate the enrollment status (from part time to full time) or type of institution (from trade school to college) of the person in question. The informant may also be unaware that the student in question has recently dropped out or changed status.

Self-Reports

The National Longitudinal Study and several other federally supported surveys have relied upon sample surveys in which the respondent provides information about himself or herself in a questionnaire or interview. Our experience with surveys of more than 4 million individual entering college freshmen suggests that self-reports tend to be accurate, particularly concerning factual information. The major issues with such surveys are the high cost and the nonrespondents.

Followup surveys mailed to individual respondents are particularly subject to systematic biases in terms of who responds. Response rates, for example, are substantially lower among racial minorities than among students in general. Furthermore, persons who have dropped out of formal education are much less likely to respond than persisters. Nevertheless, if baseline data on respondents and nonrespondents are available, it is possible to adjust for nonresponse bias through sophisticated differential weighting of respondents [4].

Perhaps the main advantage of data collected through individual self-reports is the analytic versatility and flexibility that such data provide. In contrast to aggregated data obtained from institutional surveys, individual self-report surveys make it possible to relate any variable to any other variable at the individual level of analysis. The investigator is, thus, provided with infinite flexibility in data analysis and presentation of results. The usefulness of such data sets is well documented by the many policy studies that have already been carried out with the National Longitudinal Study data base.

CONCLUSIONS AND RECOMMENDATIONS

1. Given the complexity and scope of issues pertaining to the educational development of women, some structure within the Federal Government should assume responsibility for insuring that the Government's data collection and analysis efforts confront these issues. This advisory body should comprise persons who are knowledgeable about issues in women's education and who are familiar with prior research and with existing public and private data collection activities.

At least two current HEW bodies might assume this

responsibility—the National Advisory Council on Women's Educational Programs (NACWEP) or the Education Data Acquisition Council (EDAC) in the Office of the Assistant HEW Secretary for Education. NACWEP would seem to be ideally qualified to identify policy priorities relating to women's educational development. One possibility would be to strengthen NACWEP's capabilities in the area of empirical research and data analysis so that policy needs could be translated more readily into specific data collection and analysis needs. NACWEP should, of course, be thoroughly familiar with the activities of EDAC, as well as with the work of non-HEW agencies, such as the Bureau of the Census and the Bureau of Labor Statistics. In short, NACWEP or some similar group should regularly attempt to—

- a. Delineate the major policy issues concerning the educational development of women.
 - b. Assess the effectiveness of current Federal data collection and analysis activities with respect to these issues.
 - c. Recommend changes in Federal efforts to deal more adequately with key issues.²
2. Earlier sections of this paper proposed a number of specific recommendations and suggestions for modifications in existing Federal data activities and for possible new efforts. To implement most of these suggestions would require substantial increases in the current funding levels for the agencies involved (NCES, in particular). Any new longitudinal surveys would involve particularly large cost increases, although the potential payoff from such surveys suggests that serious consideration should be given to securing the needed funds.
 3. Tabulations of data currently being collected by various Federal agencies would provide better benchmarks for assessing changes in women's educational development if (a) separate tabulations were done for new entrants into various levels of education and (b) time trend analyses, based on earlier survey years, were routinely made available.
 4. Gaps in knowledge about factors influencing women's career development are particularly severe in the pre-school and elementary school years. Small sample surveys, conducted at regular intervals and covering different age cohorts, would provide an empirical basis for exploring critical issues concerning the early educational development of women. Such surveys might be done collaboratively with NCES and the National Center for Health Statistics.
 5. The number and diversity of Federal data collection efforts suggest the need for greater coordination and planning at higher Federal levels. A number of major Federal agencies—the Census Bureau, NCES, BLS, and NCHS—are currently involved in primary data collection and analysis efforts that produce information relating to women's educational development. However, a number of other Federal agencies frequently support research and evaluation studies that yield other critical data bearing on these same issues. Among the agencies that

²For a recent effort at developing such a set of policy recommendations, see [13].

fund a substantial amount of such research are USOE, NSF, NIH, NICHD, NIMH, FIPSE, and NIE. These agencies have not only supported the collection of

primary data sets, but they have also provided a considerable amount of support for analyses of existing data sets in both the public and private sectors.

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COMMENTS

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The focus of Dr. Astin's paper on school personnel and educational development is both appropriate and informative. I would like to suggest, however, that both issues be broadened to incorporate the regulatory function of education data.

PERSONNEL

The focus on school personnel is important, but no more so than on personnel within the other major institutions of this society. I see a parallel between our concern here with equity by sex and the earlier concern with equity by race. That part of the civil rights movement of the fifties and sixties which was concerned with racial inequalities also tended to take aim at the educational and religious institutions in the United States. That is not surprising; they are generally weaker than political or economic institutions. There were many demonstrations, sit-ins, etc., in the schools, universities, and churches throughout the country. There were none, or few, at the stock exchanges, the major banks and investment houses, major corporate headquarters, or union and political party headquarters. The early sit-ins at the Woolworth lunch counters were probably the nearest thing to an assault on the economic institutions. They probably caused more general consternation and focused more attention on at least one part of the problem of inequality than many of the campus demonstrations which followed. This is not to advocate any particular form of political action, but simply to reiterate that racial and sexual inequality are pervasive and persistent characteristics of the entire society and, hence, of all its institutions. Numerous laws and administrative orders exist which seek to correct some of the inequities. In order to promote and/or evaluate compliance with such laws, there is an immediate and urgent need for sound education data.

Affirmative action programs in political and economic institutions, as well as in educational institutions, require continuous review and evaluation. Statistics on the educational attainment of women are an important parameter for the data base used in the evaluation of current affirmative action programs. The census and Current Population Survey are excellent mechanisms for the collection of such data. Analyses of the data, by the Census Bureau and the Bureau of Labor Statistics, provide an accurate description of the current national and regional picture of the educational level of the population and of the trends over time. These are not especially useful for evaluating the availability of women with specific educational characteristics to fill specific jobs in local labor markets, however.

The most detailed analysis of the educational characteristics

of the labor force from census or CPS data will not yield a very accurate picture of the pool of candidates for positions in local labor markets. There are several reasons for this—two of which directly impact on women. The first concerns the concept of labor force. It is limited to the employed and those actively seeking employment. Current criticisms of the concept include the fact that among those who are "not in the labor force" are many women who have given up seeking work, because their experiences tell them they will not be hired. This issue is beyond the scope of the present discussion and was, to some extent, covered in our discussions of employment. Suffice it to say that a "pool of candidates," defined and described in terms of the local labor force, omits many women who may be qualified for, and interested in, certain types of employment.¹ An expanded version of the Current Population Survey might be used to examine the extent to which women who are not in the labor force are qualified, in terms of education and/or experience, for opportunities in local labor markets and their availability for employment therein. Such surveys should focus on both formal education and special qualifications and training, such as the management experience outside the work force gained by women as volunteers, etc. They should also focus on the experiences women have in seeking employment and on access to on-the-job training and education. A corollary survey of major employers through the census of industry or special surveys aimed at the largest banks in the country, major corporations in the auto industry, the chemical industry, etc., should seek to establish what specific affirmative steps are being taken to find women candidates for managerial and/or supervisory positions, as well as for male-dominated occupations. These are obviously efforts to be undertaken jointly by the Census Bureau, the Bureau of Labor Statistics, and, perhaps, the Social Security Administration.

Still a third area where survey techniques might be used to obtain data on the pool of women available for professional and managerial positions is through a survey of members of the professional associations. In general, members of the American Chemical Association, the American Statistical Association, the Population Association of America, and the American Public Health Association have similar professional characteristics. It is certainly feasible to use a survey approach to compare the education and employment characteristics of male and female members (or White and non-White members). Many of the associations have already done this. Holding

¹ An ad hoc committee of the American Statistical Association, chaired by Professor Abe Jaffe, Columbia University, is concerned with the problem of defining appropriate labor market "pools" for affirmative action purposes.

educational qualifications constant, one might compare earnings, extent and pattern of mobility, and the extent to which women had been invited to apply for high-level managerial or professional posts. We are all aware of "head-hunters" in the personnel field—firms which specialize in finding top management, especially by using incentives to attract them from one company to another. Their techniques are ideal for affirmatively recruiting women. Yet, we have no knowledge of the extent to which women have been affirmatively recruited by any type of firm or institution. We hear often enough that women with the necessary educational credentials and experience cannot be found or will not move, etc. There is, however, no hard evidence concerning how many well-qualified women have ever been actively recruited for top-level administrative jobs in any industry. A survey of the membership of the various professional associations, preferably through interviews, could tell us a great deal about both qualifications and active recruitment. This is the sort of study the National Center for Education Statistics might support through private, nonprofit research organizations or which several agencies might jointly support. A similar survey might be conducted among recent graduates at various educational levels.

This is an area where Dr. Astin's plea for coordination and planning at higher Federal levels is important. In a tight money era, it might be necessary to decide that some annual surveys could become biennial in order to include such special-purpose surveys. This is not an easy adjustment in bureaucracies as large and complex as the Census Bureau, BLS, SSA, NCES, NIE, etc., where each branch and division chief is convinced that his or her data collection effort is the most vital part of the agency mission. Thus, I am suggesting three types of data gathering—from institutions, households, and membership lists. Education data, broadly defined, should be collected from all three, and the information on all three should be compatible. That is, if the survey of, for example, the largest banking institutions reveals that recruitment efforts could not locate qualified women, the household and/or professional societies surveys should indicate whether that is a realistic assessment in terms of the education and/or work experience of the pool of potential candidates.

EDUCATIONAL DEVELOPMENT

Numerous conferences and studies of the education of women up through the 1960's focused on the changing social roles held by women in industrial societies and the implications of these changes for educational institutions, programs, etc. (See, for example [2].) Among the implicit assumptions underlying many of these early concerns with the education of women was an acceptance of the notion that schooling would be interrupted or closely followed by marriage and child bearing and rearing. Labor force activity (preferably on a part-time basis) would later be combined with family responsibilities. Only in the seventies, after the considerable political activity of the women's movement, has it become generally accepted that many, if not most, women should be able to combine equitably both family and career goals and roles.

The evolution of the social roles of women (and of men) in the United States is still in progress. Indeed, change in this area has occurred throughout the history of the United States, but it has been especially dramatic and rapid during the past

decade. The demands by women for legal equality have accelerated, and a variety of generally positive responses has been made by all branches of Government. Congress has proposed and/or enacted various laws aimed at equalizing the status of women in employment, education, housing, and other areas.² Thus, the efforts of the 1960's and 1970's appear to have resulted in a real beginning of progress toward equality. Because of this, we are examining what kinds of institutional provisions have been made to incorporate women into all aspects of society on a more equitable basis. Specifically, we have been asked to examine the statistical data the Government collects to see to what extent they permit us to describe the changes that have occurred, to evaluate whether or not these changes reflect the spirit and letter of existing legislation, and whether they permit us to evaluate various efforts to implement that legislation.

Until recently, public and private schools at the primary, secondary, and higher levels of education have been regulated primarily by State and local laws. The Higher Education Act of 1972, and especially Title IX of the Amendments to the Law, changes all of this dramatically. It is the first comprehensive law prohibiting discrimination, by sex, which covers students. Title IX says, very simply, "No person shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program" [1]. There is, obviously, going to be a great deal of judicial interpretation of this legislation before the full impact can be assessed. Meanwhile, DHEW has issued guidelines for the interpretation of the amendments.

That discrimination and sex bias exist in many facets of education, from course offerings to counseling to athletic programs, has been documented repeatedly. Any lingering doubts on this question will be dispelled by a reading of the research papers in a new collection by Fishel and Pottker [1; see also 6]. The present task is to correct some of the more flagrant practices through implementation of the guidelines or regulations issued by DHEW in 1974. A wide variety of statistics (along with good will, patience, tolerance, etc.) is needed to accomplish this. Some of these are available, and others are not. Dr. Astin's paper focuses on access to and experience in postsecondary education. Again, I feel it is necessary to broaden the mandate to at least think about the kinds of data needed to combat sex bias at all levels, both formal and informal bias. With respect to the latter, it is important to note that both are prohibited by Title IX. It is obviously impossible to review and evaluate such things as counseling practices and the behavior of teachers in all school districts, so the major focus will be on change in the formal policies of schools and school districts.

Although sex bias exists at all levels of schooling, there is more differential treatment of girls at the secondary than at the elementary level of education. Because differential and biased treatment at this level affects more women in the country than practices at the postsecondary level, it is also important to see what data needs exist at this level. There are three areas in which school policies appear to most obviously violate Title IX Amendments. These are policies concerning (1) admission to vocational schools, (2) admission to specific classes, such as home economics or industrial arts, and (3) physical education and extracurricular activities.³

² For a brief summary of current laws, see [4].

³ These areas are identified by Fishel and Pottker [1; see also 3].

A variety of data exists which permits us to review current policies and practices, but many gaps remain. There are no nationwide data on the number of single-sex schools in the country, their admission policies, etc., although some States have collected such data.⁴ The studies which do exist show that more schools are available for boys than girls, and, when both sexes are admitted, boys and girls tend to be segregated by type, of course, i.e., health and homemaking for the girls, crafts and trades for the boys. A similar pattern of segregation between "home-ec" and "shop" classes appears in many junior high and high schools. Although there is no immediate way to alter the values and informal practices that bring about such segregation, it is possible to work toward providing more free choice in such matters. Existing data are limited either to a few States or to one-time surveys. The NCES, which routinely asks institutions to provide a variety of tabulations, should consider surveying all vocational schools on a regular (not necessarily annual) basis to get at the status of all enrolled students. The method has weaknesses, as noted by Dr. Astin, but the methods will undoubtedly be improved with use.

The institutional surveys could also be used to obtain data on access to athletic and extracurricular activities, the extent of expenditures for each of these activities, and the relation of such expenditures to enrollment, by sex. The institutional surveys could be coordinated with CPS supplements directed toward enrolled persons. Internal evaluations by the Census Bureau indicate that enrollment data collected through the CPS are generally highly accurate and reliable.⁵ The information collected on vocational training through the 1970 census

was not as good. The Bureau has tested a new question format for the 1980 census, however, and their recent experience and expertise with that question might prove useful.

The existence of Title IX certainly offers great potential for changing the picture concerning educational development at all levels of education. In practice, the Office of Civil Rights, which must enforce the regulations, must deal with 18,000 local school districts. Without massive inputs of personnel and money, only the worst violators will be reviewed. Our statistical data base should, therefore, be aimed at helping local districts, parents, citizens, etc., to examine and evaluate their own practices and to bring about change, based on local initiative.

CONCLUSION

There has been considerable progress toward sexual equality in the United States. Much of it has been done on the basis of moral conviction and in the absence of data. Much still needs to be done. At this point in history, a solid data base is of tremendous importance for maintaining a national commitment to this effort. In this connection, however, two aspects of reality must be kept in mind. (1) In an era of tight money and of concern with respondent burden, some difficult choices must be made. It may be necessary to substitute biennial for annual surveys in order to obtain some of the proposed new data. (2) The Census Bureau is undoubtedly a major data source for the collection of education and other statistics. It is probably the finest survey organization in the world. It is not the only source, however, and indeed much of the data we credit the Bureau with collecting is paid for by other agencies. The child care survey mentioned yesterday is a good example. It was collected through the June CPS but paid for by NIH.

This sort of cooperation among the statistical agencies shows a great deal of wisdom in avoiding duplication of effort. It also suggests that we should approach other agencies with proposals for future cooperation which are in the interests of their major mission and in the interest of furthering equality.

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VII.
Health

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HEALTH: INTRODUCTION

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Perhaps no single topic has received greater attention in the media in recent months than health. The growing preoccupation of Americans with health care and particularly with preventive medicine is a much welcomed trend; a trend which may already be reflected in reduced mortality rates from certain diseases. Accompanying this increased interest in health matters has been a change in the traditional relationship between client and practitioner in the health system. Increasingly, individuals are attempting to take on roles that were formerly performed by physicians and other health professionals. It is clear that such major changes in public attitudes and behavior in the health field place enormous new

burdens on our system of data collection and, perhaps more importantly, on the way in which we disseminate this important information.

Joined with these recent developments in the health area is the growing social concern about the status of women in our society, dating from the mid-1960's. As in the case of health, this increased awareness has been accompanied by shifts in traditional roles, with ever increasing numbers of women seeking work outside the home. Such a far-reaching social change in women's roles calls for a thorough reevaluation of the way in which data relating to women's health have been collected, analyzed, and made available.

DATA NEEDS RELATING TO WOMEN'S HEALTH

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INTRODUCTION

The first step in improving the data base on women to be derived from the health statistics program of the United States is to consider the status of women in contemporary society and the health needs resulting therefrom. An ideal data system should monitor changes in women's status and needs and should report on whether and to what extent progress is being made towards meeting needs. A rather broad initial discussion will perhaps stimulate and assist others in identifying many ways of improving the yield of current statistical programs. Since considerations of agency resources and budget limitations are continually encountered, it is desirable to develop a basis for evaluating priorities for adding to the volume of collected data, conducting further analyses, and investing in both intra- and interagency review of concepts and measurement strategies.

Contemporary data on women's health should take into account roles and role changes. Most current statistical systems are set within a conceptual framework that was developed during a period when acceptable roles for women were centered around household functions and when the participation of women in a variety of activities tended to be restricted in authority and scope. Therefore, the objectives, classifications, and data collection methods of the health data system reflected certain norms and assumptions that are less and less appropriate to current needs.

ROLES

If one focuses on women's relation to the labor force, current roles for women include continuous, exclusive performance as homemaker or earner, simultaneous performance as earner and homemaker and shifts between home and work roles over the course of adult life. Volunteer activities add other options. The mother role needs to be identified separately from that of homemaker, as it introduces its own cluster of demands, gratifications, training, and points of concern in relation to women's health needs. The role of spouse can be similarly analyzed, if one keeps in mind that it is asymmetry or lack of reciprocity that makes it appropriate to single out women here.

Within a household, two or more persons can simultaneously occupy the same role, rotating or sharing the same tasks, or distributing total tasks of a traditional role of husband or wife by mutual agreement. Readiness to take on the partner's role if the partner becomes ill is another aspect of understood roles. Health-related roles within the household are further delineated below.

Changing work patterns of women constitute a major trend

in our economy [11]. The female labor force grew over 100 percent from 1950-75 so that 46 percent of women participated in the civilian labor force in 1975, and women made up 40 percent of the labor force. The growth rate was twice that of men, and 34 percent of the growth was due to a rise in the mean number of weeks per year of labor force activity per woman. In 1970-72, 52 percent of women who worked had 50 to 52 weeks of work, 20 percent had 27 to 49 weeks, and 28 percent, 1 to 26 weeks. Temporary withdrawals for childbearing and family duties are being reduced over time, but it is not clear that this is as true for lower level as for higher level occupations.

The labor force activity changes were associated with a group of changes in actual, expected and desired family size, age of marriage and first birth, marriage rate, education, and sexual activity patterns and norms. There were "unprecedented changes in contraceptive use as a means of reducing completed family size" and more effective methods came into use. One of these, sterilization, was the method relied on by almost one-fourth of all users in 1973. By the mid-1970's, despite record numbers of young persons in the population, "the crude birth rate was below the historical low of the 1930's" [12].

Changes in the marriage rate have included declines in first marriages through the 1960's and 1970's, rising divorce rates, leveling off of the remarriage rate, which had previously been on the rise, and a reduction in the traditional difference in ages between men and women at the time of marriage [17]. In 1976, the estimated divorce rate was 5.0 per 1,000 population, compared with 3.5 in 1970, and the marriage rate was down to 9.9,¹ compared to 10.6 in 1970 [15].

Role responsibilities in relation to child care, economic activity, and management of illness are affected by the rise in households with women as the sole adult and other consequences of the changing marital statistics.

These changes in labor force participation, improved control of fertility, and displacement of marriage as a central

¹In the first 8 months of 1977, marriages were nearly 3 percent higher than in the same period in 1976, but the divorce rate was also higher [13].

Acknowledgment is made to the following City University of New York faculty who were participants in a discussion of the themes for this paper on Dec. 20, 1977 (in collaboration with the Institute on Women and Sex Roles): Anne Bloom, Linda Edwards, Alan Gartner, Marcia Hurst, Susan Saegert, and Joanne Vanik.

definition of women's identity are among the background factors that are influencing the health component of household and market activities which will be discussed. Also significant in assessing health data needs is the current examination of social thought and practice, which is revealing many biases related to women in the basic assumptions and operating rules of social systems, including health care.

When roles are not clearly perceived, analytic categories used in research can be questioned. For example, Berry and Boland, in estimating economic consequences of alcohol abuse, assume that the major impact of a woman's alcoholism will be on nonmarket activities [2, p. 33] ignoring trends in labor force participation.²

WOMEN'S HEALTH CAPITAL

The term "health capital" is a unifying concept for our consideration of health status and steps taken to protect or improve it.

Grossman [3] has advanced the concept of health as an economic asset or a stock of capital: Health is a major component of human capital. An initial stock is inherited, but it depreciates over time, while it can be increased by investing in appropriate actions. Death occurs when the stock falls below a certain level; individuals have autonomy in choosing their own length of life by putting in their own time and market goods, such as medical care and diet. Home-based activities resulting in replenishment or enhancement of health capital are termed "household production of health," and their efficiency is influenced by education.

Grossman uses disability days as the empirical measure of output of health capital in order to conduct statistical research on the determination of the decision to invest in good health. While this measure has its uses, Grossman's concept of health capital and the empirical measurement need to be better specified in relation to women by including reproductive efficiency, which will be defined shortly, as an output measure and as a motive for use of the health care market and of other actions related to health. Also, Grossman refers to "individuals" as if the household were indivisible. While this has been a characteristic assumption in competitive theory, it does not take into account distribution of resources and roles within the household related to the maintenance or improvement of health of self and others. Finally, use of birth as a point of departure and naming of inheritance as the input neglects prenatal inputs not dependent on genetic inheritance.

Women's health capital differs from men's in several ways:

1. The appropriate measures of output are not identical (and, therefore, the definitions of capacity to produce that output are also not identical). Until the end of women's fertile years, their health capital includes capacity for successful reproductive experience.

The concept of reproductive efficiency (RE) involves considering the incidence of unwanted pregnancies and of adverse outcomes of pregnancy, such as fetal wastage, infant death, congenital defect and low birth weight, in relation to total pregnancies in a given year. Using RE,

one can assess how well achieved fertility accommodates preferences concerning timing and family size, including the zero-fertility goal elected by some women, and results in delivery of healthy infants. Estimates for the U.S. population for the early 1960's, using the adverse-outcome measures just stated, have been developed by Muller, Kovar, and Jaffe [8]. Other measures of adverse outcomes could be added.

Reproductive success is an admissible concept for men in that capacity to become a father of healthy, wanted children would figure in measurement of quality of life for many men. However, women are distinct regarding the frequency and urgency of the contacts with the health care system entailed by the management of fertility and the risks of pregnancy and contraception.

Health capital, like human capital in general, can thus be conceived as the capacity to produce a vector of outputs, which, for women, includes the capacity for healthy days throughout the life cycle and reproductive efficiency. The outputs have the potential of influencing each other; that is, reproductive experiences affect general health of women and vice versa. In this respect, health capital for women is no different from human capital in general (e.g., educational capital can influence individual health and vice versa).

2. In line with this analysis, the dynamic process of personal investment in health over the lifespan of women involves reproductive history, general health history (both of which include experiences within the health care system), and the positive and negative health effects of the various role combinations in each woman's history. As suggested in the labor force figures mentioned earlier, these roles are undergoing significant transitions in society, not restricted to women entering adulthood, but at all ages [9].
3. Aside from the general impacts of life style and life events on health, household roles have a particular configuration so far as women are concerned; that is, their investment of time is divided between their own health capital and that of other members of the household, and even other households when elderly parents become health dependents.

One of the chief tasks within the household relative to health and illness is maintaining and updating a stock of health information relevant to the needs of a given household: such information is used to guide production of health within the household through diet and other practices, provision of home health care activated by illness, and optimal use of market services. Society's stock of information on health is constantly changing, and, for many reasons, individuals vary in the extent to which they keep up with the changes [6].

Other responsibilities include maintaining family health histories; identifying illness states for oneself and others; deciding about application of home health care (occasion and type of care), deciding about recourse to market services (when they should be substituted for home health care and the source to be used in a given instance); providing escort services; and providing nursing care, physical therapy, and first aid.

Not enough is known about the conduct of these activities, the division of tasks between spouses, the

²In one place, they assume loss of household production if the wife does go to work [p. 67]. In another place, they say the result will be less leisure (which is, however, described as the household's leisure without mentioning who will do double roles) [2, p. 30].

resources available, the knowledge base used, and types of decisions made. If adequate information were collected, it could be analyzed in conjunction with statistics on the amount and quality of health maintenance activities, use of market services, health status achieved, and satisfaction with the process and its results. Such data could be used to improve the efficiency of households through social investment in supportive services, including adaptation of health care systems to role shifts, task overloads, aging of personal information stocks, etc.

WHO DEFINES HEALTH?

Since the definition of health is ever expanding, and many aspects of living, such as satisfaction with roles, nutritional habits, sex education and quality of environment, can be assimilated to a concept of health, can data needs be delineated?

One can define health status as a set of dimensions for which values or states are recognized (whether as deviations from a norm, i.e., illness or as a life event), which activate major social systems by defining individuals as clients, justifying particular ministrations, exempting persons from certain roles, preventing them from assuming others, adapting environments or moving persons to other environments. Presentation of oneself at interfaces with such systems is motivated by presumed benefit to be derived, and evaluation of one's own health status is pragmatic: Is something happening that suggests that an action is likely to be beneficial (e.g., a decline in health capital would be avoided)? If a health status change is not recognized by others as the basis for action by a system, then no benefit is likely to arise from such announcements or encounters. Evidence accepted by systems include self-report, and clinical signs at initial contacts; later, investigative steps provide confirmation and justify specific protocols of treatment.

The involvement of health care providers is critical. Providers have had working definitions of health that determine the selection of individuals from the pool of potential patients, the tasks performed during encounters, the retention of persons as patients across subsequent encounters and the referral or transfer of individuals to other social systems, such as family networks, courts, or schools. These definitions have also been applied in the selection of medical school curricula and, one may venture to assert, the recruitment of trainees. In many respects, the definitions have been adopted to the needs of industry and insurance providers (e.g., criteria of readiness to work and necessity of applying expensive hospital-based services).

The complex structure of power and functions in which providers, patients, industries, governmental bureaucracies, and other social elements operate is a subject of great interest today. Sociologists, economists, political scientists, and health professionals have been engaged in formulating models that will capture relationships, explain current experience, and help predict and plan the future. For the purpose of understanding unfilled data needs concerning women, it is not necessary to evaluate the exact distribution of power between provider systems and other systems. What is important is that "health" is a term that exists within a political economy and is accepted as a signal for behavior on the part of one or more systems. Although idealized definitions, such as total well-being, serve to

shape individual behavior (comparison of one's actual state with one's ideal state being a step in the decision path hypothesized to lead to seeking care), the definitions of health that accommodate the various systems affected are applied, by and large, by providers.

Provider definitions may be expansionist or restrictive. Expansionist definitions help create and sustain a workload within the limit of capacity and locate persons in places convenient to providers by assimilating personal events and conditions to a medical model. (The medical model includes both classification of states as illness and establishing thresholds of severity, risk, etc., justifying professional management outside the household.) Restrictive definitions reject many personal events and conditions as lying outside the scope of provider intervention.

Women and men alike are best served by the health care system if the definitions of health status that are in use will reduce risk of interruption in their role performance, enlarge opportunity for work and other activities requiring sustained availability, and improve subjective gratification. These objectives in adult life are served in the human developmental period by definitions that will be consistent with a full range of role aspirations and availability for preparation.

While such goals are shared by both sexes, definitions of health status and the related body of concepts under which medical care in the United States has operated have reflected a society in which women typically occupied dependent or home-oriented roles.

This context influenced both the interpretation of norms for function and subjective symptoms and the roles that individuals were expected to assume in their encounters with health care. Examples include (a) absence of family planning from medical school curricula in the past decades, (b) interpretation of patients' questions as indicating anxiety rather than a desire for information parity,³ (c) interpretation of pain and discomfort related to pregnancy as expectable and not requiring investigation or action, and (d) interpretation of care as comprehensive even though fertility-related needs are not met.

Market interactions with patients do set bounds on the autonomy of provider interpretations of health status, but the conditions under which women have entered the market for health care have limited their power to negotiate, since they had to conform to the set of expectations and constraints imposed by family law, the job market, the organization of childhood education, and other social systems.

A revised and, in some respects, expanded definition of health is, to some degree, a corrective to disease-oriented and, frequently, provider-oriented categories, and such revision is consistent with the necessity of achieving cost control in health care by selecting preventive strategies. However, some limits are clearly needed for practical reasons, both in measurement and in design and conduct of health care programs.

It is proposed that traditional categories be changed where it can be shown that they fail to recognize conditions of women's lives in the contemporary environment of family structure, labor force participation, and aspirations and demands for equality.

The probability of securing broad acceptance of expanded

³ That is, equality with the provider concerning quantity of relevant information.

definitions is enhanced by showing (a) health care system incongruities, such as when professional standards for need for care, urgency, etc., are not consistently applied to women, (b) inefficiency of the health care system, such as when neglect is shown to be costly in terms of later care, (c) social loss, such as when family function, childhood development, and economic activity are impaired by misspecification of women's needs, and (d) nonmarketability of system offerings, such as when women choose those providers, insurance policies, etc., that come closest to their definitions of health, illness, content of encounters, and ultimately of quality of care.

GENERAL VARIABLES USED WITH HEALTH DATA

Social and economic variables of classification used in producing health statistics may need revision. Many scholars and analysts are interested in reexamining concepts and data on household structure, occupation, income, and other subjects and evaluating their applicability to present-day conditions; this paper will not duplicate their discussions. But it is essential to recognize that the crudeness of the variables of classification and their poor fit to concrete experience of women has blocked development of the most useful body of statistics of women's health. For example, health status and health care practices have been classified by education of head and family income. The first classification leaves obscure the educational capital of a husband-wife household as a whole and those who are the health decisionmakers for children and other adults. The second classification is uncorrected for family size⁴ and composition and, thus, tells nothing about per capita income. Nor does it capture availability of income for the members of different sexes.

Improved variables of classification, such as education of individuals and employment status categories that will show double roles and part-time workers, will help produce data needed to approach health problems of women effectively; at the same time, better data on health variables will help in approaching problems for which these other measurements are commonly used.

Health is a major concern in relation to equitable distribution of community resources, women's labor force participation, and other issues of general importance. Adaption of health care resources to women's needs also gives room for new health care occupations in which women could participate.

PRIVACY AND ACCESS

Another consideration in the data base on women's health is privacy as a dimension of access to service.

While access to health care has been analyzed in terms of a regular source of care, time required for travel, waiting and processing, satisfaction with information given, etc., the issue of privacy has been inadequately treated.

The concept of privacy has the dimensions of a private place, decision without intrusion of outside parties, and confidentiality of records. Privacy in health care is an economic good for both sexes, because employment and

promotion may be jeopardized by disclosure of the health conditions that people have and the medical procedures they undergo. For general health conditions, this may have a distinctive impact on women insofar as their employment status is marginal. More certain is the effect of disclosures relating to fertility and sexuality, since personal behavior of women leaves a clearer trail in the health care system, and norms for women are often more restricted. Women who do not wish to surrender to others decisions as to disclosure of receipt of abortion or contraceptive services, or who wish to control the timing of disclosure of a pregnancy that they intend to carry to term, may be legitimately concerned with the reactions of superiors and associates on the job. Such concern, particularly with respect to abortion, compels some to travel unnecessary distances for service. The decline of out-of-State abortion following nationwide legalization left a considerable number of women who have to travel to another State; while much of this is attributable to unequal availability of service, some travel may be explainable by a desire for privacy.

Another effect of concern over privacy is failure to file claims for abortion care through group insurance, which obliges patients to use personal funds. This results in impaired equity in distribution of wage supplements. If gathering cash for payment is a problem, there is a possible delay in scheduling of service, leading to more complex, costly, and risky procedures [8].

Insurance carriers tend to assert a right to personal information about claimants and to see a threat to patient rights only when sharing of the information with others is involved. In holding such views, they miss the point about claims filing: it involves contact with individuals in the employer's personnel office, the carrier, or the union health welfare fund, and possibly mail to a place of residence, particularly if copayments are required.

Inadequate attention to privacy in health care for women thus entails costs and losses, such as travel, use of private funds, and psychological sacrifice, when the loss of privacy is accepted by the patient as a condition of receiving care. Why is such sacrifice special for sensitive health services? Insurance companies share records indicating insurability, and their moral evaluation reflects very particular behavioral norms for women. Hence, future employability, credit, and access to general insurance (life, car, casualty, etc.) may be impaired. Providers are often naive about the purposes of inquirers or the security that will be maintained by them, and disclosures from provider records may enter into a long-term personal file over which the individual has no control.

Several proposed remedies for breaches of privacy in abortion financing have been described in a study by the author [5]. They include arrangement for coverage in an actuarial pool, standard benefits with no copayments that would require correspondence with the patient after service is rendered with anonymity protected by computer numeration of enrollees and individual enrollment, instead of family enrollment, under national health insurance.

Barriers to privacy in health care are interrelated with women's health capital if they deter desirable investment in health, compel use of personal resources needed for other purposes, or result in nonoptimal choice of providers.

The extent to which privacy in its various dimensions is observed by providers and insurance carriers constitutes an aspect of access to health care that needs to be specified

⁴The body of work on poverty levels by Mollie Orshansky of the Social Security Administration could be applied in this connection.

concerning women and measured. Furthermore, review of privacy protection in data collection for epidemiological study and regular statistical programs might improve the quality of data used for research and policy purposes.

NEEDED DATA: PERSONAL HISTORIES

A basic assumption underlying development of an improved data system on women's health is that general health, reproduction, household and gainful roles, and other social participation are interrelated and influence measurable phenomena, such as behavior, body parameters, and clinical signs, as well as probability states concerning future needs and capabilities. The relationships are experienced dynamically in the life of individual women and cohorts,⁵ but significant aspects are also captured by cross-sectional measurements.

In keeping with this concept, (1) histories should be collected and classified, and (2) current health of women should be classified according to personal history.

To do this, concepts of employment and occupation should be adapted to express (1) labor force participation interrupted by homemaker service, (2) part-time employment (part-day, part-week, and part-year), and (3) extensive volunteer service with and without fixed daily hours. Role combinations mentioned on the first page of this paper should be identified.

The agencies whose statistical surveys would be affected by this adaptation include the Bureau of the Census, the National Center for Health Statistics, the Social Security Administration, and the Health Care Financing Administration.

A special panel charged by the American College of Obstetricians and Gynecologists to develop guidelines on pregnancy and work has noted the need for a detailed work history and for information about "potentially hazardous exposures or activities" as a basis for individualized pregnancy management [1]. The absence of good data on work-related pregnancy hazards is viewed as a gap in according adequate protection. It is noted also that work-related hazards to male reproductive organs were also insufficiently documented. The use of histories in connection with current health data is recommended here for women, but application to men, as well, would be useful in order to carry out comparisons by sex. In the example just cited, epidemiological study to clarify causes of birth defect would be facilitated by having work-related data on both spouses. More generally, the improved insights gained by considering multiple roles in relation to health can be applied to understanding of men's as well as women's health needs.

For individuals themselves, their history and current status concerning general health, reproduction, personal roles, number of health care sources, and insurance status should be determined. Number of care sources is important for women, because a portion of primary care is received either in connection with fertility or from sources used for fertility management, as well as from general medicine providers. For women, insurance status has several important dimensions that are discussed in the following section.

NEEDED DATA: INSURANCE

In industries and occupations where women are employed, the adequacy of health insurance can be measured by

⁵ That is, groups of women born in a given period or entering some major life situation in the same era.

ascertaining benefit scope and benefit size relative to local prices. Account should be taken of sex distribution of conditions not biologically restricted to one sex to see how limitations not mentioning women specifically affect them in actuality. Account should also be taken of limitations where the effect is more obvious, as in exclusion of ambulance service during pregnancy and cases where there is a lower cap on benefits for fertility-related care than for general care.

Another important dimension of insurance is how well it fits women of different employment statuses. Included are the minimum length of employment to qualify for enrollment and the coverage of part-time, seasonal, temporary, new, and hourly employees. Since blanket contributions for fringe benefits are sometimes negotiated, transfer effects between covered and noncovered employees that raise questions of equitable distribution of wage supplements should be identified and measured. The size of groups in which women are enrolled should be ascertained, along with whether fertility-related benefits depend on the size of the group, whether they are part of basic coverage or available only by rider or endorsement and whether the employer finances them.

Benefits for employed women should be compared with those for dependents, and parity of treatment, such as between male and female spouses of covered employees, should be determined. Also needed is information on continuity of entitlement for health benefits while on leave for pregnancy or after voluntary or involuntary severance because of pregnancy and on conversion privileges if the job is lost for any other reason.

Appraisal of insurance coverage of women after retirement is of interest because of their less continuous gainful work histories, high unemployment, and lower job categories, as compared to men. Included are the percent of women in retirement ages who are eligible as the primary retiree, rather than as a dependent, whether benefits are optional or mandatory, and the size of employee or retiree payments for premiums relative to wage levels and retirement incomes.

Benefits that are contingent on family contracts should be identified; the percent of carriers and contracts with such restrictions and the percent of women qualifying should be ascertained. Application of family contract provisions to single-parent families should be studied. Provisions for student coverage through riders to primary contracts or through separate contracts should be analyzed concerning their use by young women, upper and lower age limits, whether part-time students are eligible,⁶ and how adequately fertility-related care is covered [5]. Women's dependence on spouses for health coverage through group or individual contracts leads to loss of protection in case of divorce; the extent of this problem should be measured.

The characteristics of companies insuring women for health care should be examined with regard to their financial stability, their retention rate (referring to revenues not paid out in benefits), their scale, and other characteristics affecting economic and social efficiency.

Privacy and confidentiality protections of particular concern to women, notably with regard to abortion services, should be explored. For example, is the volume of claims for

⁶ A rise of the labor force activity of female full-time college students, once well below that of males, placed them on an equal percentage level (40 percent) by 1976. The number of part-time students was greater for young women than for young men—649,000 compared with 556,000 in 1976, in the group 16-21 years old, whereas for full-time students the difference was in the other direction [20].

HEALTH

each procedure routinely reported to employers of small groups in which individuals can be identified?

NEEDED DATA: INDUSTRIES, PROVIDERS, AND ENVIRONMENTS

On insurance matters, a deliberate overlap between employer and carrier data collection is suggested. This is important, because employers sometimes say they can only buy for employees what is in the market, and carriers often say that employer preferences more or less conclusively determine what it is feasible to offer. It is time to investigate the extent of inadequacies, and also the circumstances under which the best and worst provisions are made. It is also a very practical matter to examine whether industries with heavy health risks afford adequate group insurance for specific risks. To do this, industries where women work should be classified according to characteristics of the environment that are significant for risk of infertility, poor pregnancy outcome, and general and mental health.

Pregnancy testing in industry would improve pregnancy outcomes inasmuch as the occupational environment could be controlled, but this is not likely to be acceptable to women so long as job status is jeopardized by reason of pregnancy. Recognition of excess fetal loss rates among women anesthesiologists, which led to better methods of controlling anesthetic gases, is an example of potential hazard and beneficial control. These women, presumably, were in a favorable job market. Another consequence of industrial practices related to childbearing is that women in executive ranks may postpone pregnancy to guarantee promotion, a factor predisposing to higher ages of childbearing and possibly poorer outcomes.

We need data that will elucidate the potential for relocating or rescheduling women who are pregnant and for adapting the industrial environment to the presence of women in fertile ages. Also needed is information on locational distribution of women within one employer's enterprise, so that possibilities for delivery of prenatal care, fertility control services, health education, and other services at different sites can be estimated.

Health care providers including institutional facilities, health maintenance organizations (HMO's), solo and joint practices, community mental health centers (CMHC's), public sector clinics, etc., should be categorized according to characteristics that are significant for women, including—

- employment of women in the higher status positions within the organization
- use of women as volunteers, compared with paid staff
- same sex/different sex combinations in practitioner-patient encounters
- arrangements for locational privacy
- arrangements for privacy of records
- available hours relative to peak-load hours for women with double roles
- capacitation for self-care and mutual aid organized around selected health problems
- adequacy of fertility control services

For women who spend much of their time at home, residential environments may have a special impact on their health.

Information should be collected on residential environments that would permit classifying them according to health hazards, recreational resources, emergency health care facilities, and other characteristics. The amount and qualitative features of time spent in residential environments should be analyzed by sex and related to health experience. One example is obesity in relation to social opportunities organized around food, and to physical demands of the homemaker role. Another example concerns television. While a body of literature has been created relating watching of television to violent attitudes and behavior, it is interesting that little is known about other mental states, such as depression, that may be connected with prolonged exposure to television.

Sampling, monitoring, and categorizing of industries, carriers, providers, households, and environments would then create a body of landmarks that could be used to evaluate reported health events. For example, adult women's use of services could be related to their insured status, employer policies governing sick leave and maternity leave, and household configurations.

SHORTCOMINGS OF CURRENT STATISTICS

Health, United States, 1976-1977 [12], is a report by the Secretary of HEW to the President and Congress, as mandated under P.L.93-353. It was prepared by the National Center for Health Statistics and the National Center for Health Services Research, with the advice of the U.S. National Committee on Vital and Health Statistics. Selection of statistics for inclusion was based on the criterion of relevance for policy and administrative decisions on resource allocation.

This compendium and review, extending to over 400 pages, draws on a variety of regular data sources and on certain special surveys. The data-collecting organizations include the NCHS through its statistical programs, State agencies reporting on venereal diseases, abortion and other subjects, ADAMHA, SSA, Census Bureau, BLS, the Environmental Protection Agency, and the Consumer Product Safety Commission. AHA data are used directly and AMA and other professional organizations provide data to the NCHS manpower statistics program.

Health, United States offers an opportunity to identify gaps and opportunities relating to adequate data concerning women's health and health care. An examination of the tables presented in part B, "Data on the Nation's Health," was undertaken for this purpose.⁷ It showed that for many topics figures by sex were not presented (for example, hazardous products as noted in emergency room records). For others, such as alcohol consumption and "usual place" of health care, sex, race, family income, and some other variables were used *seriatim* but were not used together to analyze the material studied. In other cases, additional relevant and possibly important knowledge could be gained by adding factors that evidently are not currently sought at all or that could be linked from other surveys. For example, in considering access to care, privacy concern is not included in the list of barriers to care. In another area, population, age at completion of projected fertility, a statistic of vital concern in defining needs

⁷ An annotated list of the tables in *Health, United States* that were evaluated constitutes app. A of this paper. In some instances, the desired statistics may exist in the source agency but either were not published or compiled.

and outlook for mature women, is not estimated. Many health-related questions would be elucidated by introducing information on type of job, home responsibilities, available sick leave, and other factors. In many cases, the insights would add to the useful knowledge base on health needs of men.

There is a need for special attention to health financing data on women, since many women are in employment categories where eligibility is less secure than for men and would continue to be so under certain national health insurance proposals. For these employment categories, too, benefits would be more meager. Yet, the sex variable is notably absent from finance statistics. Particular opportunities exist for relating fertility and health data, as in examining reason for change in contraceptive methods and relation of contraceptive medication history, reproductive history, and childrearing to current health.

For the set of fertility-related health services, a variety of unmet data needs on utilization and expenditure, and the reasons for data gaps, such as omitted items in data collection, insufficient disaggregation, misspecification, and failure to bring together information from different sources, are presented in an earlier paper published almost 4 years ago [7]. Most of these needs are still unmet. Because health care related to fertility is an important component of total health care for women, an excerpt from the earlier paper is attached as appendix B.

Both the stress of pregnancy and exposure to health care during pregnancy may lead to early discovery of diabetes, hypertension, and other chronic diseases. The effect of number and timing of pregnancies on general health and the variation with race, age, socioeconomic status, and other measures of interest should be analyzed. Although one of the major needs in Federal health statistics on women is to integrate fertility and general health data, the National Survey of Family Growth does not collect data on health status and utilization of services, and the Health Interview Survey does not collect reproductive data. While the Current Population Survey does collect data on children ever born and birth expectations, these are used only for population analysis and not to see how fertility may affect health. The response of women's health status to maternal and child health programs is not revealed in program statistics, yet is needed in order to plan the future size and nature of these programs.⁸ For planning purposes, information is needed on care received by women as affected by age, race and income level, and labor force status. The effect of Medicaid and Medicare on the flow of health services to women in different subgroups needs to be monitored and evaluated. Measures of quality that are appropriate to conditions for which women seek care and to the types of services they receive should be applied and a statistical record established. The needs of women in the most disadvantaged groups could, thus, be more effectively revealed.

EXAMPLES OF GAPS

- A. In a major national data system, the Health Interview Survey [16], a number of issues involving measurement of health status by sex are encountered.

Measured illness and disability depend on whether

one is unable to continue usual activities, seeks medical attention, or is obliged to have personal services performed for oneself or others. Therefore, measurement is deeply embedded in the social and financial context that helps determine for each sex when it is feasible and acceptable to withdraw from activity and seek assistance within and outside the household. This context includes both the norms of personal conduct and interpersonal relationships and a variety of material circumstances, such as place of work, sick leave, family size and age distribution, income, and entitlements within health care and other systems. Current data collection for the Health Interview Survey does not measure most of these factors.

1. Sick leave has different effects on work disability, depending on whether it may be accumulated beyond a calendar year. Low-income jobs in which women are more likely to be found tend not to have carryover of leave. Do women in such jobs use up their sick leave toward the end of the year, raising reported morbidity rates?
2. Do women use it throughout the year as a way of meeting needs of other family members' illness-related or other needs that are not provided for the occupational structure, such as attending a school play or conferring with a teacher, providing home care, or escorting a child to the doctor?
3. Variation in industrial provision for pregnancy disability affects the consistency of measurement of pregnancy-related illness, concurrent illness during pregnancy, and numbers at risk. That is, if there is no coverage for pregnancy, a woman may take annual leave, report other illness but not the pregnancy, or work, although not in optimal condition. Hence, there is variability in measured work-loss days, by frequency and cause, according to company provision for pregnancy.
4. Activity limitation due to chronic illness is differently reported by women who see themselves as homemakers, rather than as gainfully employed, even if they had been previously employed, which means that current measurement of rates of limitation is inconsistent.
5. In addition, the degree of limitation experienced may be affected by the presence of others in the household. This may happen two ways. The sick person may be able to sustain a higher activity level, because certain needs, such as aid in mobility, are met by others, or independence in self-care may become less imperative. When an older person has a chronic condition, sex differences in the probability of moving in with a child may affect measured limitation.

A recent study of scaling on indicators of chronic limitations, based on the Health Interview Survey, does not analyze the data by sex [10]. The fact that a null hypothesis did test the relationship between the scales and gender [10, p. 943] does not satisfy, because a person living alone has different needs and demands from one serving as homemaker or able to receive homemaker services. The study does not elicit whether need for help, level of physical activity,

⁸I am indebted to Mary Grace Kovar, Chief, Analytic Coordination Branch, Division of Analysis, National Center for Health Statistics, for the points in the preceding paragraph.

mobility, and work activity are associated with presence and role distribution of others in the household able to provide help.

Verbrugge has discussed reasons that have been advanced for higher morbidity reported by women for nine conditions for which males have higher mortality rates [18, 19]. She addresses interview behavior specifically. A sex effect is introduced into the data by use of women proxy informants for absent members, who tend to be men. Proxies are found to underreport morbidity of others, although Kovar and Wilson [4] have found the effects to be relatively small.⁹ (Women in dependent positions perhaps may not wish to perceive the earner as ill, and this may add to other reasons for not reporting as much illness as direct respondents.) In any case, double role obligations will affect both performance as proxies and adequacy of proxy data in the future. Cooperation, recall, and verbal skills are evidently not implicated in sex differences in rates reported in interviews. Theories about women's lower threshold for perceived discomfort and whether they are less reluctant to report embarrassing conditions surely need further examination. Since reported illness is defined in terms of taking a health action and not just a physical symptom, the question of whether women have fewer time constraints than men to seeking care also needs close examination in relation to roles: The hours of provider availability may clash with household responsibilities. Also, women's supposed ability to restrict activities rather than struggle to perform them may be affected by family size and age distribution of children.

B. The National Ambulatory Medical Care Survey has much interesting output on workload, case mix, and content and duration of encounter, as would be expected from a provider-oriented data source [14]. This survey could become a more effective vehicle for understanding the use of health care by women through additional breakdowns of published or collected data, deeper inquiry into categories already used, and development of patient-oriented rather than provider-oriented statistics. Additional question items and enlarged samples would be necessary in some instances.

The first major report of NAMCS presented data on annual visit rates for the U.S. as a whole, as well as for regions and metro-nonmetro areas, and broke visits down according to physician specialty and type of practice, patient problem, seriousness of problem as evaluated by the physician, time spent with the physician, treatments and services, disposition with

respect to revisit, diagnoses, and prior status as new or old patient. Age, sex and color groupings were used to analyze all these items, but only for annual rates were all three variables used together — that is, to show rates for White women in a certain age group, and for two other tables (prior status and region breakdowns) age-sex groups were formed but not distinguished by color.

Already collected data could be tabulated to show—

1. Whether male and female physicians differ concerning perceived seriousness of the patient's condition, frequency of specific treatments and tests, and disposition of visit for male and female patients.¹⁰
2. Whether time spent with the physician for conditions of a given severity varies by sex of patient.
3. Whether treatments and services for specific diagnoses vary by sex.

An average of 60 percent of all visits are made by women. Their share is larger than 50 percent at all ages except for those under 15 years old, the excess being considerable for abdominal pain, headache, and weight gain. By diagnosis, women had higher proportions of visits than men for obesity, neurosis, diseases of the genital organs, and arthritis. Information is absent on the proportion and characteristics of women and men making high or low use of physician care, using multiple specialties, and receiving care for multiple diagnoses across a year; absent also are other patient-oriented data on use of the health care system and access to it. An important omission is the use of hospital services by those receiving ambulatory care.

Whether vague states of illness are attributed to women and, if so, the reasons why this occurs and its extent are matters of considerable interest. Hence, it would be useful to know the criteria on which conditions are classed as neurosis, observation, and specific physical disorders and if they vary by sex. Furthermore, data are needed to determine how the incidence and prevalence of neurosis, tranquilizer use, alcoholism, and other emotional/behavioral phenomena vary among women of different characteristics and whether biases of treating physicians, more careseeking by women, stresses and life style, and physiology are involved in the diagnoses.¹¹

Also relevant are the process by which presenting complaints are transformed into diagnoses by physicians and the time that this process spans between encounters. It is sometimes said that women receive more prescribed medications as a result of delay in initiating diagnostic steps; is this so? "Other" treatments and services in the language of NAMCS include therapeutic listening and counseling. Is the designation "therapeutic listening" used when no psychological support is offered? Is it given more frequently to women than to men? Is it used in life stress situations? When "counseling" is reported, does advising specific changes in habits depend on assuming household support for a dietary or other change? Is such counseling used differently for each sex and for the married and unmarried?

What is the effect of different appointment systems and

⁹ Self- and proxy respondents were compared in the Health Interview Survey in 1972, as reported by Kovar and Wilson. In general, the standard respondent rules, permitting proxy replies, yielded higher estimates of excellent health and lower estimates of good health. What occurs, evidently, is explained to a large degree by wives reporting better health for their spouses than they report for themselves. There was a slight increase in males reported as in fair or poor health when "self only" was the respondent rule but a decrease in females in fair or poor health.

While the authors conclude that the results are close enough to continue using estimates based on proxy respondents they do point out that degree of health impairment reported is affected.

¹⁰ To secure valid estimates, purposive sampling of male and female physicians would probably be necessary.

¹¹ This observation was contributed by Mary Grace Kovar [4, p. 22].

arrangements of office hours on caseload mix, by problem and provider diagnosis, for each sex?

FUTURE RESEARCH ON WOMEN'S HEALTH

Future research could have, as one focus, the concept of women's health capital, evaluating it at different age levels and for different life styles, and studying its relation to utilization, the yield on alternative investments, and interactions with other forms of human capital. Another productive area of research would be the study of the distribution of health-related functions within the household, and opportunities for programmatic investment to improve household efficiency in production of health by diet, hygiene, and other measures.

Women's encounters with the health care system should be examined to show what relationships exist between psychosocial aspects of these encounters and the treatment options, quality of care, and outcomes that are experienced by women. Dynamic aspects of women's health and health care could be approached by both longitudinal and cross-sectional studies, development of lifetime aggregates and sequences, and other lifecycle-oriented statistics. Monitoring of women's participation in HMO's, health planning agencies, and all innovative systems or institutions in the field of health is essential in evaluating system performance concerning providing equality of opportunity. It also could be correlated with measures of system effectiveness in dealing with women's health problems and meeting humanistic norms in patient care.

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APPENDIX A

ANNOTATED LIST OF TABLES

Tables from *Health, United States, 1976-1977*. (Short titles are used for identification. Specific suggested improvements are shown under each title.)

Table 4. **Percent of population changing county or state of residence 3/70-3/75 (age 5 and over)**
Who initiated move within household?
Relocation of school-age children (source of stress for mothers).
Is environment totally new or similar to old environment or is move a return to former area of residence?

Table 5. **Components of population change (births, deaths, net migration)**
Geographical distribution of women, areas with large influx of women, employment status of migrants by sex.

Tables 6-7. **Population projections under different assumptions of completed fertility; age distribution assuming 2.1 births per woman**
Age at completion of projected fertility.

Table 8. **Percent first births/all live births**
Percent of first births by age at first birth, by social class.

Table 9. **Contraceptive use by currently married women: method, age, and poverty level**
Users dissatisfied with or apprehensive about method.
Unmarried users and nonusers.
Women who have changed methods and reason for the change.
Source of payment for contraceptive services.
Ever users of abortion services; contraceptive failure experience.

Table 13. **Birth rates for unmarried women**
Proportion of pregnancies terminating in induced abortion (see table 98).
Source of financing for abortion and for delivery.

Table 15. **Live births and birth rates by geographic division and state**
Measures of adequacy of obstetrical services, by locality and by availability to low-income women (updating the 1967 survey of the American College of Obstetricians and Gynecologists).

Table 18. **Age-adjusted death rates by geographic division and state**
Relation to morbidity and other health status indicators, by geographic area and sex.
Relation to environmental factors.

Tables 23, 25, 28-30. **Death rates by location of residence, and for selected causes by age, sex, and color**
Relation to personal history and social class, developing measure of social class appropriate to each sex.

Table 31. **Hazardous consumer products**
Score by sex and type of activity involved in reported cases (and by task levels).

Table 32. **Air pollution by source and type of pollutant**
Exposure, by occupational distribution for men and women.
Time spent in exposed environment per year by sex.

Tables 34-36. **Smoking status by sex, family income, and age**
Less stress jobs and more stress jobs and smoking, by sex.
Evaluation of stress level from household and nonpaid roles.

Table 40. **Self-assessed drinking levels—junior and senior high school students**
Specification of both parents' occupation and relation to drinking level.
Drinking level of students by sex.

Table 41. **Consumption of alcohol, age 18 and over**
Two-stage breakdown: sex, by race, family income, marital status, and education.
Three-stage breakdown: sex, by race and family income, etc.

Table 42. **Selected characteristics of problems drinkers**
Unemployment control figure based on all women in labor force and not just "heads of household."

Table 43. **Obesity (skinfold) 20-74 years**
Relation to parity, job-connected necessity for conspicuous consumption of food or for "competitive appearance."
Relation to marital status, responsibility for food preparation, eating out, psychosocial factors.

(See also table 43—self-assessed weight status and tables 45-46—weight control effort and methods.)

Familial convergence: Both spouses overweight and trying to lose and other combinations of weight status goal and method.

Table 47. **Persons exercising regularly**
Exercise opportunities by sex.

Table 48. **Live births by starting month of prenatal care, by race**

Relation to insurance coverage, pregnancy testing, and regular source of care.

(See also table 49, by age.)

Table 54. **Persons with a usual place of medical care, by age, sex, color, and family income**
Two-, three-, and four-way breakdown (see table 41).

Table 55. **Barriers to medical care**
Two-, three-, and four-way breakdown.
Add privacy concern to list of barriers.
Inconvenient hours analyzed by sex in relation to demands of household roles and nonhousehold roles.

Table 57. **Usual place of care**
For women, record usual place for fertility-related services, as well as for other health care.
Tabulate breakdown by sex by color by family income.
Adjust family income for family size.
Explore availability of income for each member's health needs.

Tables 58-60. **Deaths from selected causes by weather, holidays and day of week**
Report by sex and employment status.

Table 61. **Self-assessment of health**
Two-, three-, and four-way breakdown.
Analysis of meaning of excellent, good, fair, and poor health levels to individuals in such terms as readiness to take part in certain activities, comparison to parents' health, comparison to other family members, and dependence on medication; differentiate by sex and role categories.
Monitor adjustment for proxy responses.

Table 62. **Occupational injury and illness in the private sector**
Report by sex.

Table 63. **Selected chronic conditions by degree of limitation (all ages, and 45-64)**
Report by sex and definition of major activity.

Table 64. **Chronic conditions by age, sex, and family income**
Breakdown of sex by family income.

Tables 65-67. **Influenza and other upper respiratory conditions: incidence, restricted-activity days and bed disability days**
Report by sex.

Table 68. **Disability days by type of disability day, age, sex, and family income**
Rates for currently employed women, by double-role responsibility.

Table 69. **Disability days and acute conditions by sex and occupation**

Rates by type of sick leave. Check for end-of-year reporting bias, if any.

Table 71. **New active cases of tuberculosis**
Two-, three-, and four-way breakdown.

Tables 74-75. **Venereal and notifiable diseases**
Report by sex.

Tables 84-87. **Office visits to physicians**
Use of telephone to supplement office visits, by sex.

Table 95. **Outpatient psychiatric services**
Report by sex.

Table 101. **Discharges from non-Federal short-stay hospitals**
Relabel pregnancy complications (XI) so that normal childbirth is not encompassed in an illness label.
Reexamine symptoms and ill-defined conditions to find if there is a sex difference in the apportionment of conditions to this category rather than to definite diagnoses.
Identify familial and social stress as category.
Present figures by employment status.

Table 105. **Discharges and persons with 1+ episodes**
Two-, three-, and four-way breakdown.
Identify home support network for patient and nurturing duties of patient as variables that may affect discharge rate and probability of hospitalization (marital status, family size and composition, and labor force status).

Table 106. **Nursing home residents**
Rates by sex related to previous occupation, pension, and family composition.

Table 109. **Inpatient psychiatric services—patient care episodes**
Present data by sex.

Table 110. **Place of inpatient psychiatric care**
Present data by sex.

Section 301-320. Health Manpower

Tables 112-122. None of these tables shows sex of the professionals covered. Also valuable would be changes in school enrollment by sex, and estimated male/female, male/male, and female/female distribution of practitioner/patient pairings (a) by specialty and (b) adjusted for physician-substitute personnel.

Table 123. **Inpatient facilities, beds, employees, and patients**
Sex distribution of employees and patients by type of institution could be added.

Table 129. **Percent of hospitals with specified services**
For fertility-related services, prevalence in relation to number of women in given geographical area.
Development of estimates of family-member time

required to take advantage of rehabilitation and other special services.

Section IV, 341-373. Health Expenditures and Health Insurance Coverage

None of the tables estimates expenditure, insurance coverage, and reason for lack of coverage by sex. Some of this is due to reporting systems of operating programs, such as Medicare and insurance carriers. Some is possibly due to exclusion of sex variables in reports of surveys. (Another factor may be summarization from more complete reports.)

Part E. Medical Care Price Changes

It should be possible to price a sex-specific package

of services adequate for needs of a cohort of women and for a cross section. Physician fees for obstetrical cases are shown, but this falls short of the concept of a package by sex. Such data would be useful because (1) fertility-related services including fertility control, delivery care, etc., are needed for healthy (and sick) women and (2) prices pertinent to women's needs could be compared with insurance benefit provisions to determine adequacy.

Table 176. **Economic costs of illness**

Present estimates by sex, but also show alternative assumptions about labor force participation and valuation of homemaker services that enter into final estimates of indirect costs. Also show relation of direct cost to insurance and use of services at a given level of severity by sex.

APPENDIX B

DATA GAPS ON FERTILITY-RELATED SERVICES [7]

Several different types of data gaps can be distinguished. First, data on a subject, such as dollar expenses of hospital departments of obstetrics and gynecology, may be absent. In this category we cite the lack of information on infertility care received, the utilization of drugs in pregnancy, early infancy, etc., with the exception of obstetrical anesthesia, and expenditure on drugs, and the omission from statistics of many cases of fetal loss in which no surgery was performed. Sterilization is noteworthy for the dearth of information on the reasons for selecting this option for fertility control, the use of hospitals for the purpose, unit costs, expenditures, and insurance experience. We need to correct this type of gap by additional questions within present surveys which cover an untouched area (e.g., charges) or add detail to an area (e.g., purpose of a medical visit) or even by new surveys.

A second type of gap is insufficient disaggregation. This can be corrected by expansion of samples so that additional breakdowns of data are feasible. Whereas, for example, color and region may be included in study variables, to show a piece of information by color within a region requires larger numbers than presentation related to either variable alone.

A third type of gap is lack of relatedness—that is, because information on different subjects is from different sources, it is difficult to tie together, for example, receipt of prenatal care, outcome of pregnancy, and presence of insurance. The time reference may be different, the populations not identical or compatible, and the questions in one area not planned with a view to shedding light on the other. We need to correct this by expanding the range of topics in a survey—the number of fertility-related service components included, and the aspects covered—utilization, expenditure, preference or potential demand, perceived availability, and insurance. An alternative to the single survey is studies that can be linked as to time, space, and comparability or identity of the population.

A fourth problem arises from misspecification, including incomplete specification. (1) For example, “partial” insurance

for maternity is associated with aspect of care—for example, whether coverage applies only to hospital care for delivery rather than amount or adequacy. (2) To relate medical, service, and financial aspects of a pregnancy to the mother's employment status, a definition of usual activity would be in order which not only referred to labor force participation during “most of the past 12 months” but elicited how this might be influenced by the pregnancy itself. The finding would have implications, *inter alia*, for adaption of employee group insurance to fertility control. (3) The statistical formula must be appropriate for extraction of needed material from a study. In the Health Interview Survey, questions about care received by infants under 1 year may miss neonatal illness for children of 11 months, since only the experience of the past 6 months is used. It is doubled to produce tabulations and the earlier experience is not utilized in the numerator whereas the older babies are retained in the denominator. (4) Finally, within the problem of specification is use of categories which make it possible to identify abortions performed in outpatient facilities or outpatient units of hospitals where a stay of several hours is customary.

The incomplete universe exemplified by the excellent data from PAS, regrettably available only for subscribing member hospitals, holds back the process of generalization from otherwise valid experience and is a type of gap. The member hospitals, being larger, probably care for both the medically solvent and the poor with selected medical and demographic characteristics and the effect of these biases is not easily established.

Attention to these various gaps would increase the potential of our important national surveys to produce data on numbers in need of fertility-related health services, branch frequencies (expected utilization of specific services within a broad category, such as Caesarean section within the category of obstetrical deliveries), money charges, and insurance coverage.

COMMENTS I

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INTRODUCTION

Charlotte Muller's paper reviews many factors which affect women's production of health status and their consumption of health services. Her discussion points out an important fact, namely, that our understanding of women's production of health and consumption of health services is a function of our understanding of the various roles which women assume, roles which are changing but about which many historical biases still exist. Unfortunately, these biases are reflected in traditional health data sets and, therefore, limit true understanding of women's health status.

Muller points out that, in order to understand the production of women's health status, data collection on women's health should include information about reproductive efficiency, fertility, general health status, personal health history, and employment and nonmarket (household) responsibilities. Her conclusion is based on a definition of health that is similar to Grossman's concept of "health capital" to which she adds the concept of "reproductive efficiency" and a more precise statement about women's roles as homemakers, mothers, and wage earners. These roles may be complements and/or substitutes, and women move into and out of them over time.

This comment first discusses general points in Muller's work which warrant further elaboration. Several omissions are then noted and discussed. We also question the importance of other issues in the paper which, while being useful and interesting research questions, are possibly less useful in determining Federal statistical needs on women's health. Specific points in Muller's paper on data gaps are then combined with the authors' work for a summary of important data questions to be considered when studying women's health.

Before commenting in detail on Muller's paper, however, it may be useful to reflect on the basic rationale for Federal data collection efforts as a way of putting into perspective the various issues discussed in this and other conference papers. First, Federal statistical needs relating to women are presumably a direct input into Federal policy relating to women. For economists, any Government intervention should be based on public finance criteria. While the general knowledge acquired from Federal data-gathering efforts clearly has the character-

istics of a public good, it is important to establish other grounds on which the acquisition of specific information is justified. Women-specified data are needed only where (a) sex may be the basis for differential social and private benefits/costs, e.g., where health problems affect men and women differently, (b) sex-based discrimination in health policy is suspected, or (c) program evaluation pertaining to the alleviation of (a) or (b) is required. While it may be easier to collect information on every aspect of life, the role of government must be properly delineated in terms of policy purposes.

COMMENTS ON GENERAL ISSUES

One of the more important issues raised in Muller's paper is the influence of sex-specific differences in perceived health status, according to one's role, on the demand for certain health services. However, the analysis of the importance of role differences and corresponding perceptions about health status is not well integrated in the paper. The various impacts of one's role on perceived health status are mentioned in nearly every section of the paper, but the subject does not receive systematic attention. Similarly, the distinction between the static and dynamic aspects of women's roles on their health status is incomplete. Further, Muller discusses only role differentiation as a result of women having both household and labor market duties; participation in voluntary activities is only briefly acknowledged.

While we certainly agree that many public policy issues in women's health directly relate to sex-specific role differentiation, there are other factors that may augment our understanding of how roles affect health status. For example, economists recently became aware of the concept of "dependency," a concept originating in the psychological and sociological literature. Muller touched on the notion of economic dependency when she advocated that data on income source be collected for *each* household member and especially female members. We support this suggestion and contend that females' health status perceptions, their demand for health services, and their time allocations are affected by the extent to which both economic and noneconomic dependency may prevail. Further, we contend that the relationship between economic

dependency and female health status is an area in which there is a great need for data and research.¹ Thus, the entire question concerning the influence of role perceptions on health status and the demand for health services is an area in which there are numerous interesting and, with appropriate data, testable hypotheses.

Another important contribution of Muller's paper is its analysis of sex-specific differences in the content of health capital. Muller suggests that women's health capital includes the capacity for successful reproductive experience. She concludes, therefore, that identical measures of output and the use of the same inputs to produce that output may not be used between men and women. While these points are important, there are conceptual problems in Muller's discussion. First, by including the capacity for successful reproductive experience as a component of women's health capital, the possibility that health capital is also an important input into reproductive efficiency is precluded. While the exact interrelationship between health capital and reproductive efficiency has not yet been specified, it certainly appears to be more of an interactive rather than unidirectional one as Muller posited. Exact specification of this synergistic relationship is, albeit, technically difficult and requires longitudinal panel data.²

We are also unclear why Muller differentiates health capital output measures on a sex-specific basis. It would seem that Grossman's measure, the flow of healthy time yielded by a stock of health capital, is not a sexually biased output measure. It may be that different combinations of inputs such as education, fecundability (on the part of both men and women), employment, household status and roles, income, and health care yield a different stream of healthy time for men versus women; this remains another testable hypothesis.

CRITICISM OF CONCEPTS DISCUSSED AND THOSE OMITTED

Muller's paper basically discusses data needs on women's health in terms of a set of research questions which are presented as being specific to women's health, e.g., childbearing and related reproductive-efficiency issues, potential discrimination in health insurance coverage and privacy in the release of information about health service consumption. The following sections discuss concepts which we feel were relevant, but omitted, as well as our criticisms of some points that were included.

¹ While the study to be cited was conducted in an entirely different society and the focus of the analysis on another economic issue, the importance of the dependency status concept concerning women in understanding their labor market behavior is instructive and would yield considerable depth to our understanding of role-definition change and its impact on the health status of women in the United States. (See [3].)

² The term "reproductive efficiency" is used in the text. However, the terms "fecundability" and "fecundity capital" are more appropriate from several important perspectives. Reproductive efficiency is an *ex post facto* measure of pregnancy outcome, similar to fertility, but more expansive in the sense that it focuses on all outcomes, not only live births. Fecundability, on the other hand, is a measure of potential reproductivity which can be considered as an important choice variable not only by the individual but also by policymakers. One's fecundability can be considered as a human capital asset which can be augmented by various health and other investments; it will yield a flow of services from that capital over time. For those with an interest in these topics, see [4; 5; 8].

Omissions

While Muller expands Grossman's concept of health capital to include the concept of reproductive efficiency and to account for women's different and changing roles, she omits some important issues. First, the paper focuses almost entirely on prime-age (working) women whose physical health problems are often directly related to fertility. While this subset of the female population does attract much current public policy attention, health status questions on elderly and teenage females do merit discussion, particularly since these age groups are frequently target ones for Federal programs. For example, Medicare and federally subsidized family planned services for teenagers are not insignificant Federal health programs whose primary beneficiaries are females. Furthermore, Muller makes no mention of chronic diseases, the incidence of which is often higher for females.

Second, Muller relegates discussion of mental health status to a brief footnote. We submit that any comprehensive data collection effort must consider the joint and independent effects on both mental and physical components of health status. Indeed, recent work indicates that self-reported mental health status appears to have a statistically significant effect on later self-reported physical health status.³

Questionable Inclusions

Muller's approach to and extensive discussion of problems between privacy and access seem questionable. First, a more appropriate term than "access" appears to be "utilization." The term "access" connotes both demand and supply issues, i.e., the geographic availability of services and/or the financial requisites for consumption of these services. Utilization is precisely a demand issue, i.e., the consumption of or willingness to pay for a particular service. In a Lancasterian model, privacy would be one attribute of a service for which the consumer would pay or, assuming that health care is a merit good, to which the consumer is entitled.

Having resolved definitional problems, we also contend that the effect of privacy concerns on utilization is generic to health care. For example, social stigma is a centuries-old barrier in the diagnosis and treatment of venereal disease. Whether the social stigma effects are more profound on women's utilization of health services, particularly fertility-related services, is a testable hypothesis.

Muller assumes that the effects are greater for women and then discusses the need to collect data to specify and then measure provider/insurer breeches of privacy and employer misuse of health data. The direct relevance of this exercise for Federal statistical policy on women's health is unclear. The policy implication appears to be Federal policing of health data uses and recrimination for data misuse. The policing would likely, at best, be only a mild deterrent. Proving an employer's unprofessional use of health data is a heroic

³ The work by David W. Dunlop, Sandra Tychsen, and Larry Revo on longitudinal data from the Human Population Laboratory of the State of California's Department of Public Health shows a significantly positive relationship between a measure of mental health status as of 1965 and a measure of general physical health status in 1974. The work and related analysis are being incorporated into a final report to the National Center for Health Services Research and Development on a research project titled "Economic Impact of Unemployment and Inflation on the Health Status of the Poor."

task, and under present sanctions, the resolution of a problem would lie within the courts and not the Federal data-gathering agency. Difficulties encountered with affirmative action suits are good similar examples. Suffice it to say that we question the assumption that policing of data distribution and use will significantly reduce the effect of privacy concerns on *utilization* of health care services.

Most importantly, Muller does not address what we consider to be the most problematic issue related to privacy and the conduct of research, namely, patients' under- or nonreporting of the receipt of certain health services. This problem jeopardizes data validity and compromises the relevance of research findings for public policy purposes. The problem of underreporting by consumers can be partially reduced by reliance on collecting data from providers. This collection process, however, must be subject to even stricter confidentiality regulations.

SPECIFIC POINTS ON DATA GAPS

In the latter sections of her paper, Muller discusses gaps in existing information on women's health status. She uses data presented in HEW's *Health, United States*, the national Health Interview Survey (HIS), and the National Ambulatory Medical Care Survey (NAMCS) as examples. Generally, the lack of data for understanding women's health problems, which Muller identifies, e.g., the dynamics of role changes on health status, *could* be remedied if longitudinal-panel data sets were established. Also, she identifies and discusses a need for data on health insurance.

Longitudinal Data Sets

The present availability of longitudinal panel data sets is minimal. One possibility is that a set of health status questions could be added to existing longitudinal data-gathering efforts such as the University of Michigan's Consumer Panel. By adding a health status and health-care utilization module, health status could be studied in relationship to role and employment changes. Also, the Bureau of the Census could add health questions to its surveys. The census is an excellent source of data on labor force participation behavior and also could provide an excellent longitudinal data set on health status. The Bureau could also add health questions to its samples from which *Current Population Reports* are generated.

It should be noted that several health-panel data sets are available and, though none is a perfect substitute for the oft-dreamt-of national longitudinal panel, they could be useful. For example, the Human Population Laboratory of California's Department of Public Health has a panel of approximately 5,000 people, 50 percent of whom are female, who were surveyed in 1965 and 1974. Health status and other socioeconomic and demographic variables for the interim 9 years were monitored retrospectively. Also, the cities of Tecumseh, Mich., and Framingham, Mass., received funding to establish longitudinal panel data in order to study heart disease. Other information in the data base, however, could be used to study other health problems, including those of females. In addition, these cities could be used to conduct health surveys on other related health problems, and records could be linked to obtain longitudinal information.

Finally, several panel data sets are available on American

Indian tribes.⁴ While economic and cultural roles of women may differ in these groups, the data are available and could prove insightful.

Health Insurance Data Needs

The health insurance research questions that Muller raises are important. However, her discussion focuses only on questions of employment-linked insurance benefits for working women. Total insurance benefits over one's lifetime must also be analyzed. For example, due to increased female longevity, Medicare benefits accrue mainly to women.

Second, while there is some evidence to show that (a) women insurance policyholders receive fewer benefits than women who are beneficiaries of male policyholders and (b) there are discriminatory coverage provisions between men and women holders, the issue may be more germane to the specific policy question of private health insurance as a means of financing health care rather than as an issue in ongoing Federal statistical collection.

Other Data Needs

Muller omits other data needs on women's health which merit discussion. For example, abortion is not only an important component of Muller's reproductive efficiency measure, it is also the most commonly performed surgical procedure in the United States. It is, of course, only consumed by women [9]. Pre- and postabortion consumption of other physical and mental health services must also be considered. It seems that even though political realities may preclude or impede dispassionate analysis of policy issues on the consumption and/or financing of abortion services, one must specifically address data needs on abortion when analyzing data needs on women's health.

While estimates of the unmet need for abortions [17, pp. 58-59] have been developed, data for a more thorough analysis of the *demand* for and *supply* of abortion services are limited. Currently, the Center for Disease Control coordinates collection of information on abortions performed in each State through State health departments. The information is published in the CDC's abortion surveillance reports. However, a recent report of the National Committee on Vital and Health Statistics (NCVHS) concluded that the available data on abortion were limited and of variable quality and that a program to gather abortion data should be an important priority of the National Center for Health Statistics [15, pp. 35-37]. Further, the NCVHS suggested that (a) the data obtained from the National Survey on Family Growth related to abortion be more widely analyzed and (b) that "funding be made available for properly prepared surveys of the population at risk to allow a more complete understanding of the forces behind the decision to have an abortion" [15, p. 37].

A proposed survey instrument has been developed to address the latter issue by analyzing the demand for abortions performed in free-standing abortion clinics. The survey is based

⁴ Joseph Lipscomb of Duke University is conducting health program evaluation research on the Papago Indians in southern Arizona, and he reports an excellent longitudinal data set on the health status of this group of native Americans. To understand his analytical approach, see [7].

on individual observation data and incorporates not only medical information about the type of procedure consumed and possible complications but also a number of social and economic characteristics of the woman and the household.⁵

Nutrition and Women's Health

There has been little systematic analysis of the impact of women's nutritional status on their health status. In reviewing the health status section of [12], many of the differences in the sex- and age-specific death rates for the 15 most common causes of death can be related to differences in nutritional intake between men and women. For example, diabetes is the only disease of the 15 common causes of death in which the female death rate is greater than the male death rate. It is interesting that of the major nutritional problems identified in the Ten State Nutrition Survey, obesity is a major nutritional problem in adult women. While the onset of diabetes has not been firmly linked to obesity, studies have shown a high correlation between the probability of developing diabetes and being overweight [16].

There are three excellent sources of nutrition data available on the U.S. population on an individual observation basis. An analysis of these data on a sex-specific basis could yield some additional insight into the health status of women. These data include (a) the data collected from the Ten State Nutrition Survey, conducted from 1968 to 1970 [3], (b) the first and second Health and Nutrition Examination Surveys, conducted in 1971-72 and 1977,⁶ and (c) the U.S. Department of Agriculture Study on Food Consumption,⁷ particularly the 1978 study.

Chronic Health Problems, the Disabled, and Vocational Rehabilitation

While women generally have lower earnings than men, it is important to recognize that disabled women, regardless of race or age, are even more poorly paid than any other group. According to data from the Bureau of the Census in 1973, disabled females, depending on their age and race, earned

between 5 and 12 percent of the earnings received by non-disabled White males 45 to 54 years old.⁸ The earnings figures for disabled females were at least 30 percent below any other group considered.

Vocational rehabilitation, a major State-Federal program, is designed to provide rehabilitation services to individuals suffering from chronic health problems and is a way to address this income disparity. The program has expanded in recent years to serve a larger set of the disabled population. While the estimated rate of return to vocational rehabilitation services for both men and women has been calculated as being very high [1], the program may be sex biased. There are two key issues: (a) are there sex biases concerning who is accepted into the program and (b) are there sex-biased outcomes of the rehabilitation process.

In order to analyze the program's admission policy, it would be useful to know what proportion of all applicants who are not initially accepted for services are women as compared to men, by age and type of disability. Second, two authors recently suggested that the vocational rehabilitation program has essentially only increased the number of female rehabilitants categorized as "homemakers" [6, p. 45]. It would be useful to know what proportion of all women who are successfully rehabilitated are rehabilitated as homemakers, rather than prepared for reentering the labor force or entering it for the first time.

SUMMARY

This paper has further discussed the main research and data needs defined in Muller's paper. The conceptual contributions of her discussion of (a) the impact of differential roles on women's health and (b) reproductive efficiency and its impact on women's health capital were both acknowledged and critiqued.

The need for longitudinal panel data sets for analyzing the health problems of women was discussed and the pressing need for data to study abortion services was highlighted. The importance of nutrition on women's health status and the role of vocational rehabilitation for women were also reviewed. The intent of the comments was to both critique and expand the concepts presented in Muller's work. The comments are offered in a spirit of collegiality and intellectual stimulation. Muller's paper and these comments still have much to cover; the work evidences the importance and complexity of the issues on Federal statistical needs relating to women's health as well as the usefulness of this type of forum for exploration of the issues.

⁵ For further information on this issue and a copy of the proposed survey instrument, see [2].

⁶ The results from the first HANES study are reported in [14]; the results of the second HANES study have not been tabulated as yet.

⁷ See, for example, [10]. This document and others in the same series provide information on household food consumption in 1945, 1955, and 1965-66. The 1977-78 survey, completed in April 1978, will provide more detailed information about nutritional intake by individual members of the household, as well as many other important social and economic characteristics of each individual household member.

⁸ See [6, fig. 3, p. 9]. Their source was [11, table 9].

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COMMENTS II

Lawrence M. Kahn
University of Illinois

The notion of "health capital" has recently been used in economics to explain individuals' investments in health care (both preventive and corrective) and, ultimately, their "choice" of life span. According to this theory, a person chooses the amount of health to purchase on the same bases that govern the demand for any commodity: prices, income, tastes, preferences, time discounting factors, etc. An implication of health capital theory is that, other things being equal, those who suffer from poor health have chosen not to invest as much in health capital as those whose health is good.

Although such a theory may be logically consistent, there is a potential danger in treating the purchase of health similarly to the purchase of any other commodity, for example, apples. This danger consists of the possibility that, by treating health status as resulting from individual choice, we end up blaming the victims of poor health for their plight. Although individuals clearly do make choices about health, they are subject to constraints, in this area, social policy and data collection procedures might be well directed toward the constraints themselves, as well as individuals' choices. For example, an obvious constraint on individual choice about health, which we have good data on, is income: Low income people cannot afford to pay for good health care (if provided on a payment-for-service basis) as much as high income people. However,

other constraints on individual choice suggest themselves. First, localities vary in their provision of public health information and in publicly subsidized delivery of health care services. Information on the availability of these systems can be added to census data on individuals to better explain their investments in health care. For example, birth control information and services aid women (and men) in their choices about family formation. Second, establishment data can reveal race and/or sex differences in the type of health insurance plans that are provided. Such plans vary according to the kind of services covered, deductibility, maximum benefits, etc. For example, the availability of maternity and/or paternity leaves may well influence birth control decisions. Third, many health problems result from factors beyond the control of individuals. For example, many diseases are caused by viruses that are difficult, if not impossible, to avoid. It would, thus, be useful, along these lines, for health researchers to determine the degree to which it is possible for people to prevent and/or cure diseases. Fourth, it may well be the case that a major influence on individuals' health status is their environment—cleanliness of air and water, purity of foods, etc. In conclusion, it appears to me that the decomposition of the causes of good or bad health into those subject and not subject to individuals' control is at least as important as the study of individuals' choices, given their environment.

RESPONSE TO DISCUSSANTS' COMMENTS

Charlotte Muller
City University of New York

The specific focus of this paper was those aspects of the life situation and experience of women that are distinct from those of men and that affect health status and health care. The gross distinction—and interplay—between household and labor market roles, and the disadvantaged status often occupied by women in the labor market, have not been systematically considered by the statistical organizations that provide data used for making policies. The relation of fertility and fertility health services to general health has often been undervalued. While undertaking to point out several broad issues and exploring a conceptual framework to guide statistical compilation and analysis, the paper did not attempt to review all data needs on women at different ages and in different conditions of health. To have done so would, in many instances, have involved presenting statistical needs that were not unique to women. However, the paper and the appended review of NCHS data do include references to desired data on elderly, teens, behavioral and mental problems, and chronic illness. Clearly, there are many subjects for investigators to pursue.

It is true that the issue of privacy is not confined to

women. However, the specific way in which privacy needs in relation to fertility care interact with opportunities for discrimination against women in the labor market and elsewhere in society does make it reasonable to include privacy in this paper. Raising the issue may speed correction of an important deficiency in the previous definitions of access to service for all sensitive health conditions. Policing is by no means the only remedy. The revised text now includes reference to desirable features of insurance design that would promote privacy and that have been discussed in previous work by the author. Considering these in relation to specific situations, such as those involving abortions, clarifies the implementation issues.

The concern of Kahn with victim blaming is appreciated. The paper itself has many examples of problems traceable to factors of income, environment, etc., mentioned by him. However, the concept of health capital itself is not tied to assuming free choice and absence of various specific constraints; it can easily be applied to expressing the effect of poor environment, availability of services, and other adversities on individuals.



VIII.
Challenges



CHALLENGE I

Barbara A. Mikulski
U.S. Congress

On behalf of the Congresswomen's Caucus, we feel that we played a role in instigating this particular conference. When the 95th Congress convened, the majority of the women in Congress decided to form a Congressional Women's Caucus. We felt that, as a group, we could, in many ways, become the Congresswoman-at-Large, rather than any single one of us taking on that responsibility. We decided that one of the things that we wanted to do was to meet with individual Cabinet people to do what, particularly on affirmative action issues, we called "consciousness-raising" or "jawboning." Other people had other words for what we had to say to them after they left. One of the very first people we met with was Secretary Kreps. As soon as she walked into the room, I tell you, it was like sisterhood in bloom. We said, "Pull up a chair. God, do we need you."

We knew of her brilliant career as an economist and someone who has played a major role in developing the theory, thinking, and quantitative tools to measure issues like the woman in the household economy and a variety of other things.

We began to ask Secretary Kreps a variety of statistical and data questions that we felt we needed as we undertook the issues for which we had priority. And she said, "Wait a minute. I'll call my staff." Well, of course, then it became calls to many of you here, and I think out of that came the idea that perhaps there were insufficient data on the whole issue of women and particularly women in Federal policy. So we were happy to play that starting role.

We women in Congress are very sensitive to data and particularly what we would consider demographic forecasting. You know, we hear all the time, "You've come a long way, baby," as well as, "What do you all want?"

First of all, without resorting to cloning, we would like to double or quadruple our numbers. One day Congresswoman Schroeder walked over to the Library of Congress computer and said, "Given our current incremental advancement, how long will it be—now that there are 18 of us women in Congress—before 50 percent of the House of Representatives are women?" We didn't even ask about the Senate. And the computer came back and said, I think, "216 years."

We were somewhat dismayed and depressed at that but, nevertheless, we intend to proceed, and we look forward to working with you.

My own professional background is that of a professionally trained social worker. So in many ways, for years, I've been a closet data collector. And I am very happy to be with my colleagues here tonight, particularly those of you who are involved in social policy.

Essentially, my talk has four points that I would like to

make. Number one, the way, or the failure of the way, we gather data shows our systematic discrimination against women.

Number two, what we do, or rather what we do not do, with the data that we have shows a lack of concern and commitment to women's issues. Third, the data have to be humanized. And fourth, that both data gatherers and data users have to become much more activist—activist in the workplace, activist in the community, and activist in terms of other women's groups.

Now, let me go back and elaborate on those four points that I've just made. Number one, I'd like to comment on the way we gather data and how I feel that it has shown discrimination, particularly in three issues that I've been involved with as a member of the U.S. Congress.

About a year ago, I took the initiative, as my role in the Congresswomen's Caucus, to work with Lindy Boggs and Newton Steers on drafting legislation for family violence. Immediately I was besieged, both by press and by other members of Congress and their committees, for data. How many women are victims of battering? What are the statistics? On and on went the questions.

So we turned to Federal agencies and people whom we thought could help, so that we could begin to rally support. Number one, we found out that there was no way, at this point, or at least a year ago, of knowing how many women were battered. Number two, that there was no reporting to police. Number three, that it wasn't required in crime statistics. LEAA didn't include it. The FBI didn't include it. The Justice Department didn't necessarily take a look at it in any kind of systematic way that we could use.

I could only conclude that one of the reasons that those questions have not been asked in the 200 years of our Republic was that people simply did not consider them important. Let me go on to another issue.

I'm on the Communications Committee, and one of the things that I feel that I took on was the whole issue of EEO in public broadcasting. I was very much concerned that public broadcasting could offer tremendous opportunities for employment. I also felt that one of the places to begin was in the area of public broadcasting, that before I could get NBC, ABC, and CBS to have a different employment profile, we had to take a look at public broadcasting, because it is my theory that if you take money from all the people in America, then you should open the doors of employment to all the people in America.

When we began to look at just basic raw facts, we saw that public broadcasting had a very dismal record in terms of employing women and minorities. Public broadcasting has

been around for almost a decade. It was established in 1968, and, in 1968, Martin Luther King was assassinated. 1968 was 4 years after the Civil Rights Act had passed, and now it has been 15 years since the famous march on Washington in which there was a cry for employment opportunities, particularly in the public sector.

At the recent hearings on new legislation for public broadcasting, I asked the Corporation for Public Broadcasting, "What is your data collection methodology?" And first of all, they told me their dazzling civil rights record. You know, everyone brings out their vita and says how terrific they are, that they gave to CORE in 1959, or something like that.

And that's supposed to be so terrific. So I said, "What are you doing?" And they said, "Well, we're developing a quantitative tool." Well, I thought that was great. So I said, "What is your quantitative tool? Describe for me its nature. Describe for me its methodology." You know, all the kinds of questions you would have asked if you had been a member of Congress at that hearing. And they said, well, they were working on it. And I said, "When did you begin working on it?" And they said, "Four months ago, Congresswoman." And I said, "When will your quantitative tool be done?" And they said, "Well, you know, this is very difficult. This is a primitive new field. We can't tell you when it will be done." Well, I said that I felt that for a field, broadcasting, which is a genius at ratings, which knows how to target its facilities and so on, that they could develop a tool, consult with other EEO specialists, which would begin to tell us the data that they have, number one, on access to employment, and number two, on upward mobility with employment, because I'm tired of their coming in to tell me how they've increased something by 500 percent. You know what that means? That they've gone from hiring one Black secretary to five Black secretaries. That doesn't exactly turn me on.

So we just show you that in public broadcasting many people don't really see or sometimes aren't aware that this could be an important issue.

There's also been a lack of sufficient data and information as we've moved along in Congress on things like part-time and flex-time jobs, on displaced homemakers; how many are we really talking about, as we've begun to work for the extension of the Equal Rights Amendment. We continually hear how good women have it on these so-called lush alimony payments. Somehow or another you get it that half of the divorced women in the United States are living down in Palm Beach, picking up John Travoltas off the beach.

And what we find is that there are no real data on child support or on alimony, both number one, that's been awarded and number two, on what is actually collected. It is just my perceptions, as it is Congresswoman Heckler's on the Joint Economic Committee, that alimony is not really what everybody cracks it up to be.

But one of the things that concerns me, too, has been Social Security. This again shows the problem of collecting data. I'd like to really salute many of the women who worked at Social Security, particularly people like Mollie Orshansky, the great creator of the poverty line.

Mollie, ever since I did my thesis at the University of Maryland School of Social Work in 1965 and used your poverty line, I've been dying to meet you. You've been a folk hero to me. I feel like I'm meeting the statistical Margaret Mead. But I really say that with a great deal of warmth and affection, because I think her work has really been pioneer

work. But one of the things that we found (we, meaning again the Congresswomen's Caucus) was that the data on Social Security reform really were not there. Congresswoman Keys and Congressman Fraser have been attempting for more than 3 years to get certain essential data that they needed for their efforts in changing the inequities in Social Security.

Let me tell you the kinds of things that they've been asking for 3 years. We wanted to know, for example, at a recent meeting with Joe Califano, why are the majority of SSI recipients women? Are they poor because they lack Social Security coverage or because their Social Security payments are so low that they qualify for SSI or because the very nature of our work cycle means that they are both in and out of the work force and, therefore, don't accumulate enough quarters for coverage, or whatever? How many of the retirees receiving the minimum Social Security are women? He said he couldn't tell us that.

We asked, "Who collects survivors' or retirement benefits early? Are they mostly women? How would that affect public policy?" Again, no answer to something as basic as that. "How many women have worked in Social Security covered employment but don't qualify for their own benefits? And how many men? And how does that compare? How many children today are collecting survivors' benefits on the basis of their mother's coverage? How many are collecting them on the basis of their father's coverage? And what are the future projections because of the changing profile?"

Now these were basic questions, and we couldn't get answers and until we do, the Ways and Means Committee tells us they cannot, and will not, begin to act on some of the discriminatory aspects of Social Security as they pertain to women.

We've met with Califano twice and, finally now, he says he's going to get the data, but I can tell you, we met with Wardman before he left, then we went back to Califano. We met with everybody else who was there to liaison and coordinate with us. You know how that all goes. We're still looking for our data.

Now, this brings me to a second point. Although the data may not be in, those of us in this room and, generally, American society know that society has radically changed since the 1930's when Social Security was first created. Families are no longer composed of a husband who earns the money and the wife who takes care of the children and the home. In fact, this picture represents probably less than 10 percent of the households in our country.

These are the facts that we know and, yet, even though we know those facts, it is not resulting in any kind of major changes related to public policy. The point that I want to make is that, very often, even though we know the data, we don't use the data in a way that generates action. On many issues, there's plenty of data available. Right now, we know that there are 7 million children of working mothers and less than 1 million licensed day-care slots for preschool children and that there are, therefore, 6 million children in unsupervised, unlicensed type homes and, yet, there is no major day care legislation pending in the Congress of the United States.

We know that people are growing older in this country and that most of the old people are women and that most of the old people who are women are poor and, yet again, no action was happening until Maggie Kuhn and her Gray Panthers got people together and began to organize to create the awareness for the kinds of programmatic actions we need. We know that

40 percent of American women are now working, and that whole business of "Run, Puff, Run" readers with Dick and Jane is dead. We know that that just isn't true. While Dick is off to the factory, we know that Mom is pounding the beat and, very often, the only job she's going to get is maybe working as a salesgirl at the Roy Rogers fast food chain, where, at age 40, with varicose veins, she's going to have to dress up in a mini-skirt and go "Ya-hoo!"

Now I have problems with that, and I feel that right now, we're not paying attention to our data, and we're not setting up our society and our social policy as if that 40 percent actually existed.

If, in the Congress of the United States, I hear one more debate about the little woman at home, I'm going to either get neurodermatitis, my hair's going to fall out, or I'm going to go out and get drunk with Billy Carter. I don't know which.

There's a growing feeling that for all the research that we do, the only thing that sometimes happens is that think tanks are getting money to study victims with very little action going to help the victim. In fact, there's now, even in Congress, a growing backlash against research and quite candidly, with you here tonight, I'd like to say, in many instances, I have felt that same reaction myself. In terms of my own feelings, for example, on some of the issues pertaining to women, what we see very often is that people, again, want to study the victim and not want to help the victim. In my hearings, George Miller and John Brademas and those of us involved with family violence, the grassroots groups told us, time and time again, that we're tired of seeing the money go off to some Massachusetts think tank when we can't get the bucks to run a hotline in Iowa. Let me just give you two examples of what we mean.

During the course of the hearings on family violence, the National Institute of Mental Health told me that they had been studying family violence since 1968. That's already a decade. During that testimony, they told me, "We've been studying it for 10 years and it's in epidemic proportion." So I said, "Can you tell me how many women have been killed?" "No." "Can you tell me anything about battering? Can you tell me about the women who have been bloodied and burned and beaten?" "No." Then I said, "Even if you can't give me the exact numbers, you're sitting there telling me it reached epidemic proportion?" They said, "Yes." I said, "What the hell did you do with those numbers? Did you even tell anybody? Have you told Califano?" "No, he's new."

"Did you tell anybody in the past 10 years who's been a Secretary? Assistant Secretary? Did you even tell your liaison or your coordinator? You know, the new chair of your inter-agency task force on coordination."

The answer was "No," so that, though they have studied the problem for 10 years, there was no initiative to do anything with those particular data to generate action. If we take a look at this problem of women and alcohol and drugs, we know that there has been a tremendous number of studies done. Right now, a study's just been completed by a wonderful feminist who has really, I think, completed a definitive work on the subject.

It was delivered to my office. We began to contact some grassroots groups who were interested in lobbying and developing programmatic responses in this area, and they began to call the agencies. Now this is a great report, lots of good, sound professional data, good recommendations for oversight and legislation and when we began to call and get copies of

the report, they told us there was none available. Now that report's just been done. I can't believe that I'm the only woman in America with a single copy and, if I am, then I ask IBM to step forward so that we can copy America with it.

We found out, as we began to call about the results of that study, that nobody within the agency knew that the study had been done. There was no plan for followup on that study and the woman who had been contracted for the job, now an expert in the field, is out of a job, now that her statistical data gathering is over.

We called the coordinator of the study, and she called an institute at the University of Washington in Seattle, one of the largest users of Federal research dollars on the issues of drugs and alcohol. One of the questions she asked them was, "What action has ever come out of all the studies that you've done on women alcoholics?" And they said, "We don't think that's our responsibility. Our responsibility is to gather the data." Well, this isn't a butterfly collection, ladies and gentlemen, that people gather for their own private enjoyment. This is public dollars to get public information to help the American people.

For those of you who have data, and maybe it's in your bottom desk drawer—I know how it works. I used to be a welfare administrator. I had a lot in my bottom desk drawer, waiting for the minute I could bring it forward. Let's bring it forward, because I happen to think that data are important. But data must be turned into action. Corporations and foundations, which are excellent users of data, must begin to take that data and begin to put it into action. Let's get those reports off the shelves and let's get them in the mainstream. Let's get them out to the grassroots. Let's get them to the State Houses. Let's get them to Congress. We don't know half the things we buy with that research. There's no way. People like me are victims of data overkill. A member of Congress goes from one hot potato to another in a given day.

I might be sitting on the Communications Committee one minute, going off to Maritime Authorizations in another, and being picketed later on in the afternoon. It's a little hard for me to keep up with everything. We had withdrawal symptoms when the farmers left, because we weren't being demonstrated against. It didn't seem like Capitol Hill.

The problem is we need people who will organize, particularly in your professional associations, to bring this to our attention.

Another point that I want to make is my theory that data will lead to action if it is humanized. I feel that one of our problems is that data aren't always made human. Let's just take statistics and I don't mean that cavalierly. We can talk about—a recent TV show brought this to mind—6 million Jews killed in World War II. You hear the number 6 million and somehow, it doesn't evoke anything, but along comes a TV show called "Holocaust," and it traces the family of Weiss and all of a sudden, that 6 million has a whole different meaning.

We know other statistics. We know that 60 percent of psychotropic drugs, 70 percent of the antidepressants, and 80 percent of the amphetamines are prescribed to women. We also know that 80 percent of women alcoholics use other drugs. Now you heard all that—60 percent, 70 percent, 80 percent and yet it doesn't do anything until Betty Ford issues a press release and says, "I have a problem with overmedication and I'm going into the hospital to find out what I can do about it." And a few weeks later, that very gallant and brave

woman comes out and says, "I've not only got a problem with drugs. I've got a problem with alcohol. I'm going to stay in the hospital and I'm going to fight it." All of a sudden, that whole issue of women being overmedicated, the women who have had drinking problems, the women who've been overmedicated by their own physicians, becomes a national problem, becomes a national issue and, I hope, becomes a national priority.

Now that's what I mean about humanizing data. Certainly with Mrs. Ford as a national figure, she really brought it to public attention and for that, we should be eternally grateful. But I think for all of us in our work, we need to begin to humanize data. The way I see it being done is by a few techniques with which I'm sure you're familiar. One, get the anecdote, get the personal story, that somehow, when I read those reports and read about 40 percent or 80 million or whatever, if I have one story about one person or three case examples, it has a tremendous impact on me. When I know how it's going to affect an individual or how it's going to affect a family, it means a great deal.

I know that many of you are in work that's very tough, in many ways, very tedious, and is very difficult. I would encourage you to go out into the field. That is another one of the ways I keep myself, or try to keep myself human, because in Congress, with all the volume we deal with, you can kind of forget why you're there. In Congress, we continually work with enormous quantitative data, and we vote by a plastic card, and we use very abstract language. For example, when we talk about the neutron bomb, we don't talk about murder, we don't talk about killing, and we don't talk about exploding the cells in your body. We talk about irradiation of the entity or of the target. We don't talk about blowing up the people of the Ukraine, with their cells exploding all over the place. I mean, that would be a little too gruesome. It's not gentlemanly to talk about that on the floor of the House of Representatives.

So when you deal in things like that, you have to do things that give you a human perspective. What I do is hold regular town hall meetings, and I try to go to the people that are most affected. When I was working on my family violence legislation, I went to the House of Ruth in Baltimore and talked to the women's shelter and spent hours there, getting to know their problems, talking with them. I can tell you, it had a major impact on me, not only on what the shape of that legislation should be, but every time I began to falter, every time there was pressure to water it down, I saw those women's faces in my mind's eye, and it kept me going in the same way I know that Lindy Boggs' being on the Board of Directors of the House of Ruth here has kept her going in this rather prolonged fight. So, I would encourage you to do that.

Look around in your own office. When you hear about 40 percent of the women in the work force and the difficulties that they're having, walk down the hall and talk to the secretary or to the women delivering the mail and say, "How much do you make?" "Where are your children in day care?" "How much does your day care cost you?" "How much does your transportation cost you to go back and forth to work?" Pretty soon, you'll find that just the cost of coming to work on transportation and child care probably takes about 40 percent of her income. But when you hear her and when you see her, working to get that corporation to establish a day-care facility or to get them to begin to think about having day care on the premises of their factories will become a very different kind of reality to you.

I feel that if we began to do that, we'd get more human policies in corporations and maybe even in Congress, or we'd have day care and van pooling. Maybe if McIntyre at OMB came out from behind his charts and talked to some of the women who worked for him, he wouldn't be so quick to deny the concept of day-care facilities in Federal buildings.

One of the things that I feel is that we've got to ask the right questions, and we've got to have the right people asking questions. I'm glad that you all are here and that you're concerned. I've been part of that brainwashing of America, where they told me because I had certain biological characteristics, I wasn't supposed to like math and I'm sure you know that, or that statistics were for boys, and the only numbers I ever had to worry about were in playing post office. Ha-ha-ha!

Remember all those rotten jokes when you were a teenager? Am I glad I'm not a teenager anymore!

But the fact that you're here, the fact that you're professionals in this field, go back to your old high school, go back to your own college, encourage women to come into the fields you're in, into economics, into other aspects of data gathering. If it's one thing I heard during transition team was, "Where are the qualified women?" And when Secretary Kreps said, "If you'd look around, you'd find us," she was right.

But in order to look around and find more of us, just as there need to be more women in Congress, there need to be more people like you in this room. Guidance counselors don't know what you do. But if you could, on your next vacation back home, go to that high school, maybe there's somebody just like you who, at age 16, is a little scared in trying to make up her mind on what to do and maybe you could change her life by telling her how, through your work, you're changing the lives of others and maybe even changing the destiny of America, which takes me to my very last point.

Both people who gather data and people who use data, I feel, need to become more activist, and I think that the way we need to do that is by volunteering our time. I know sometimes the word "volunteering" is not a very good word with women, but I feel the only way we're going to bring about social change is by volunteering our services in the grassroots activities.

Let me give you a couple of examples, because I feel you have very special skills, very special abilities, and very special resources. My background is that of a community organizer, and one thing that I know, as a former warrior in the poverty program and a neighborhood organizer in my own community is that we did not have the time or the resources to develop the data that we needed to bring about social change. I'd like you to think about getting more involved.

Think, for example, about getting involved in political campaigns, those of you who know about demographics and those of you who know about statistics. You know, very often, there are women who want to run for political office who don't know how to gather all that precinct information, who when they take a look at the census information, don't know what it means. You could help us to gather it and target our own resources. When I was running for the City Council for the very first time, the only information I had is what the bookies were telling my Uncle Pete, and the bookies were telling my Uncle Pete that the odds were 200 to 1 against me. So much for bookies.

But there are other things that you could do, even in your own job or as part of the Federally Employed Women or other

groups. I know that when we first got elected, the representatives of the National Women's Political Caucus and I met with Secretary Kreps to talk about affirmative action policies within U.S. Department of Commerce agencies, which, at that time, were not particularly aggressive. She had the data from her own personnel department which was, quite frankly, not the best. They didn't have those quantitative tools.

However, there had been a group of women who, on their own, had volunteered, who very much are like the women in this room, maybe some of you are actually here, who gathered the data of both entry and upward mobility in the Commerce Department. At that meeting, we were able to share with Secretary Kreps important data regarding the lack of opportunities for women and minorities which we know then resulted in a major policy reorganization and certainly a reorientation of thinking that changed the Commerce Department in many ways.

I could go on and on about other opportunities to serve, whether it's working with a hotline that helps rape victims, so they could begin to quantify how many they help and where referrals come from, what happens in the way of follow-up, so that, number one, they could get funding to keep themselves going, and, number two, when they went to the police or to the social service departments, they could deal in hard facts about what happens to people.

The opportunities to be an activist—well, the list is as long as your computer printouts, and I think that if we took the time to take a look at them, you would find whether you want to work in politics, whether you want to work in the job, or

whether you want to work in grassroots groups. I feel that there are lots of opportunities to plug into.

Quite frankly, I just want to conclude by saying that we need each other. I know that I have colleagues and sisters all over this country who are on City Councils in the Minneapolis and the San Franciscos and in the little rural townships, and women who are on school boards and library boards and that there are women in State House positions, etc., and we don't have our data resources.

When I was a member of the City Council, all I had was a part-time clerk, which was a \$4,000-a-year patronage job. I didn't have the resources to gather the information on what was happening to rape victims, what was happening to women in the CETA programs, etc., so that if I found people like you, who could have helped me, and could have helped other City Councilwomen, and other women in State legislatures and not only women, but those other people—other gender—who would also like to play a role in bringing this change, it would have been of tremendous help.

So when I say we need each other, you can help us get the information, and together we can lead the fight. We can speak out, not only with rhetoric, but with fact, with substance, with a feeling within ourselves and a security within ourselves that what we're talking about is real and, by damn, you'd better listen to us. That's one of the key ways we're going to bring about social change.

So God bless you. I know She's on our side and I look forward to working with you.

CHALLENGE II

Sarah Weddington
The White House

The question that I want to address is that of the consequences of the conference. Often, it seems to me, we go to conferences; the papers are good; and we enjoy meeting the other attendees. Then the conference is over, and we all go home. Even with the best of intentions, somehow not much ever happens.

As you attend these sessions, there are a number of issues that you ought to be considering in your own minds. One obvious issue is how the work of the conference fits into policy considerations. More importantly, what should we be asking of the Federal Government in terms of what they should do in statistics? Can we reach a consensus on that?

Obviously, not everything we ask for can be done all at once. But it is important that we know what it is that we do want and that we have backup options that are realistic and practical and that can be done now.

Another thing I find that most groups never do is to determine who the proper person is to accomplish what the group wants done. For example, the Domestic Council is currently in the process of preparing a paper to present to the President on how he can respond to the International Women's Year (IWY) suggestions.

A conference like this cannot accomplish all of its objectives by itself. It must build coalitions with other groups to achieve a lot of possibilities.

I know that all of you paid a registration fee. I wish the registration price were the fee and three good ideas. I am sure someone had an idea and said to Juanita Kreps, Secretary, U.S. Department of Commerce, "Why don't we have a conference on statistical information?"—and that is the reason we are all here. Sometimes a simple idea, worked through, brings marvelous results. There should be not only a group commitment to issue a report, but also there should be an individual commitment—a commitment of personal involvement—to help alleviate the problems discussed at this conference through your suggestions to the steering committee and through your efforts in the future.

No group is ever effective unless there are individual participation and dedication. One of the old sayings I used to like in the Legislature was, "If you aren't a part of the solution, then you're a part of the problem." If you're not a part of solving the problems that you've raised, then you are a part of the problem.



IX.
Public Policy on
Statistical Issues



WOMEN AND NUMBERS: SOME POLICY ISSUES

David W. Breneman
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It is a pleasure to have been asked to comment on the public policy issues involved in the extremely interesting papers prepared for this conference. In fact, I have found the papers and the discussions both interesting and disturbing; certainly, many of the statistics presented in the Farley-Bianchi paper regarding the rapid increase in divorces and in the numbers of illegitimate children born in this country are enough to make anyone reflective. In my comments, I will discuss initially some of the broader implications of the rapidity of social change for statistical agencies, then make some remarks about the relation of research to public policy, and conclude with a few implications drawn from the conference for universities and statistical agencies.

A common theme in all of the papers is the degree and rapidity of social change in the United States in recent years and the increasing irrelevance of many of our statistical categories for coping with the evolving nature of society. This discussion has prompted me to ponder how a statistical agency, charged with keeping useful and meaningful time series of data, can accommodate increasingly rapid change. It seems to me that two capabilities are required: First, the statistical agency must develop the ability to identify the fundamental categories and structures, avoiding the transitory and ephemeral, and second, it must develop the ability to withstand the pressures applied by the growing numbers of single purpose, special interest groups that want to see questions relevant to their interests introduced into every statistical survey.

Turning to the first point, the discussion led my thoughts back to undergraduate studies of Spinoza's metaphysics, with its emphasis on reality manifest through fundamental modes and infinite attributes; in fact, rather than having an economist serve as a discussant, I almost think the conference would be better served by a philosopher. In any event, the reason I found this line of thought interesting is that in a time of rapid social change, many of the developments that we take to be of great importance and lasting significance are likely to be found trivial and ephemeral. The best example from recent experience is Charles Reich's book, *The Greening of America*, published roughly 10 years ago [3]. No sooner was the ink dry than what Reich was announcing as a dramatic and permanent shift in attitude and behavior had become passé. However, had the Bureau of Labor Statistics sponsored a conference at that time on the significance of the social trends discussed in the book, I shudder to think what we might have done to our statistical surveys on labor force participation.

The second capability relates to the growing number of special interest groups that are focused on Washington,

establishing associations and other forms of organization in an intense effort to lobby for highly specific interests. For example, in the field that I know best—education—there are few organizations that are concerned with education in general, with a willingness to investigate budgetary tradeoffs; instead, each categorical program has spawned its own special interest group that argues strenuously and effectively for increased appropriations and for other special treatment, such as the development of survey data and statistical series relevant to its interests. The pursuit of good public policy is clearly hindered by the rapid increase of special purpose pleading of this type.

Given these two needs—an ability to sort out fundamental categories from the ephemeral and to fend off special interest groups not critical to society's broader interests—how does one evaluate this conference? First, the conference's focus on women as an organizing category is clearly fundamental, not transitory. Furthermore, one could hardly call a majority of the U.S. population a special interest group. Consequently, the basic concerns of this conference easily meet the criteria I have set up for evaluating the legitimacy of requests for changes in Federal statistical surveys.

There are some aspects of what has been discussed, however, that strike me as verging perilously close to the transitory and the ephemeral. For example, Watts' and Skidmore's argument that surveys should concentrate on the individual as opposed to the family unit, on the grounds that families are no longer stable nor a particularly useful statistical grouping, may place too much emphasis on what might become a transitory phenomenon of the 1970's. Perhaps it is just the word they used—individual—but I was reminded of several recent and persuasive essays that have described the 1970's as the decade of narcissism, with each member of society concerned not with his or her role in a community or social setting, but rather with the person in splendid isolation. I think many of the broken marriages that have occurred during this period have resulted from the sudden force of the women's movement striking people who were married under a different set of values. People caught in this rapid change may have had little recourse but to dissolve marriages contracted under very different understandings. But this shock to the

The views expressed in this statement are solely those of the author and should not be attributed to the trustees, officers, or staff of the Brookings Institution.

social system will not strike successive age groups with similar force—the young will have grown up with it. Consequently, I suspect that in its emphasis on the individual, this conference is no longer on the cutting edge of social change, but rather it is in danger of institutionalizing a brief, but important, transition in the Nation's history. As successive age groups come to maturity, I believe that marriages will be contracted in ways that will not produce the type of instability that we have witnessed in recent years. The intensely individualistic lifestyles of the 1970's will not endure, in my view, because the strong emphasis on the individual in isolation and not in relationship to other human beings is not a stable or satisfactory basis for development of the human personality. So, much as Charles Reich captured an important aspect of a brief period in the 1960's in his *Greening of America*, but an aspect that did not survive, I suspect the heavy emphasis on the individual that permeates this conference will also not endure.

What one can safely predict is that the nature of human relationships will continue to evolve in ways not easily foreseen. Thus, in establishing a format for surveys and for social statistics, the Census Bureau must search for a comprehensive structure that is able to accommodate any type of social change. Although I have quibbled with aspects of the rationale that Watts and Skidmore present for their proposed classification system, the structure they have developed seems able to handle virtually any change I can imagine. Before their classification is adopted, however, I hope that people from many different fields would be asked to test it against their visions of society's development to make sure that the classification could accommodate all of the varying views of possible trends.

My second set of comments concerns the relationship of social science research to public policy. A basic weakness in this conference—assuming that one of its purposes is to enhance the ability to influence public policy—is that only one side of the market for research is present—the supply side. Suppliers of research are represented here both by those who collect and supply data and by those who use that data for research. What is missing, however, are the potential users of that research, the policymaking groups that we all hope to influence.

When a group of researchers interested in women's issues confronts representatives of the various Federal statistical agencies, the results are completely predictable (and have occurred at this conference). First, there are calls for more data, new surveys, better longitudinal studies, etc. Second, there are pleas for greater disaggregation of existing surveys, such as we have heard in the discussion of alimony and child support payments as separate items in income surveys. Researchers always want more and better data and have every incentive to press their requests, since the costs will be borne by the statistical agencies. Thus, while many interesting ideas have surfaced here, this easily predictable result will not have been very useful unless some organized followup is made, wherein the costs and benefits of each proposed change are carefully weighed. In my view, the steering committee has just begun its work, with the real effort required in the months to follow.

If the policymaking side of our market had been present, we might have found that the issues would have been very differently posed. I cannot give a good example from the area of women's issues, but I have observed in recent months how

the issue of the middle-income financial squeeze, coupled with rising college costs, managed to catch the research community almost totally by surprise. And yet, no issue has recently dominated education debate in Washington more than the drive for tuition tax credits or expanded student aid for middle-income students. Not only did the research community get caught by surprise, but this is the type of emotionally charged issue where the outcome is not likely to be much affected by data and rigorous analysis. Economists could demonstrate that college costs have not risen more rapidly than median family income, but that information has done little to blunt the political drive for some sort of middle-income tax relief. The constantly changing nature of policy issues and the inevitable lag in the statistical base and the ability of researchers to pose and develop answers to pressing policy questions suggest, at a minimum, that we must constantly bring policymakers, politicians, and researchers together in some forum so that those who are endeavoring to supply research results pertinent to public policy will have a better notion of the issues that decisionmakers see as important.

What are the implications of this conference for universities and statistical agencies? First, concerning universities, I believe there is a critical need for graduate programs to allocate more time than is currently done to the study of existing data bases, survey sources, and their limitations. In my own graduate study of economics at Berkeley, we received extensive and elegant training in economic theory and the theory of econometrics, but very little time was spent on the much less glamorous, but equally important, task of learning about data currently being collected and how those data could be used (or misused) in empirical research. The type of training that many graduate social science programs currently provide overemphasizes theory relative to data in ways that cause many graduate students to develop a somewhat cavalier attitude toward the latter. The typical dissertation often involves skillful development of a theory followed by a cursory attempt to test it using any data that can be found, without submitting the data to rigorous examination. I submit that many of the problems and limitations of our current data bases would be caught much earlier if more graduate programs were teaching students about existing data sources and requiring students to become familiar with the actual surveys used and some of the problems associated with survey research. Many years ago, Oscar Morgenstern wrote perceptively about this issue in his book, *On the Accuracy of Economic Observations* [2], a volume that should be required reading in every social science graduate program.

Second, if we want academic research to influence policy, we must rethink the incentives that operate within the academy. Scholars will produce what is valued and rewarded within the setting that they function, and often this is not the type of work that is useful in the public policy forum. To be effective in that forum, scholars must communicate with generalists, and this requires the ability to interpret results in ways that can be understood and acted upon by busy people. Perhaps the graduate schools of public policy will develop professionals who understand the needs of the groups they hope to influence; there is no intrinsic reason, however, why all of the social sciences cannot make valuable contributions, but academics (particularly the untenured) who do so must not be penalized.

In my comments directed to the statistical agencies, I will not discuss the many suggestions for survey changes made during this conference, since others have done that well. Instead, I have a few general comments that are applicable to the topic of this conference, as well as others.

First, the discussion brought to mind Earl Cheit's observation, some years ago, that statistical agencies and museums share in common a tendency to spend large sums of money on acquisitions but relatively little on analysis (or display) of those acquisitions. We still have not reached the point where social scientists have ready and easy access to the survey data bases collected by the Bureau of the Census and other agencies. For example, in work underway at Brookings, we recently had hoped to use the Survey of Income and Education, as well as the National Longitudinal Survey of the high school graduating class of 1972. Although, in both cases, data tapes are available, extensive cleanup and other work are still required before the information can be readily used for research. In the case of SIE, the would-be user must stand ready to purchase more than 10 separate data tapes. Perhaps these problems are inevitable, but if each agency were successful in arguing that a greater share of its budget should be spent on intramural research and analysis, a more useful product would emerge.

A second and very different point is the need for surveys to be designed to capture changes that are taking place in variables of interest, rather than merely recording their absolute sizes at any given date. In economists' jargon, this is a plea for more emphasis on flows rather than on stocks. The reason for this request is that virtually any policy change one can imagine will have little immediate effect on the total stock of individuals of whatever type or grouping one is interested in, but can have an effect on the changes occurring in the group under consideration. Thus, for policy purposes, surveys should always be designed in ways that can detect changes in variables rather than simply total size.

A final point concerns the incompatibility of surveys designed by different agencies, although concerned with the same sector of the economy. A recent editorial in *Science* magazine [1] discussed this problem well in the context of surveys about academic science. In these several surveys, the editorial pointed out that fields of science are defined differently, levels of aggregation differ, and basic definitions differ, resulting in only limited use being made of merged files linking surveys about the same population. Perhaps the current Congressional interest in a Federal Education Data Acquisition Council (FEDAC) will be a step toward improving this situation.

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TWO SUGGESTIONS FOR STATISTICAL POLICY

Robert Parke

Social Science Research Council

One strong theme running through these papers and commentaries is the need for statistics on transitions—the changes people undergo from enrolled to dropout and back again, from employed to unemployed, from nonpoor to poor, etc. Barbara Bergmann asks for good data on flows (that is, transitions) from employed to unemployed and vice versa, data on flows between these states and not in the labor force, and data on the duration of these states [1]. Harold Watts and Felicity Skidmore point out that household configurations are transitory [4], and Reynolds Farley and Suzanne Bianchi ask for data on the rapidity of household change, the differences in the impact of widowhood and divorce on various population groups, and how long children spend in families [3]. Isabel Sawhill, in her discussion of Nancy Barrett's paper, points out that divorce—which breaks the relationships through which most women are connected to the wage and salary producing parts of the economy—is one of the prime factors throwing women into poverty. We are not getting the data we need on these transitions.

Our statistical system relies on survey designs that produce the world's best statistics on the state of the population—its enrollment, level of education, labor force status, poverty status, etc. Few, if any, countries produce statistical series having the substantive richness and technical quality illustrated, for example, in the charts presented in the Farley-Bianchi paper.

What we get from most of our surveys is cross-sectional estimates of the numbers of people in various statuses. But when we turn to the subject of change, what we get, with few exceptions, is net change, measured very roughly by comparing cross-sectional estimates. We get very little data on transitions.

We don't put up with this in our basic population figures. We insist on the components of change, that is, how many people were born, how many died, and how many migrated. Why? Because it makes an enormous difference how change occurs. The numbers of people involved in these processes have at least as much meaning for us as the size of the net change. This is no less true of employment, marital status, household membership, poverty, and other matters.

We need data on transitions between these states, and if our current statistical designs won't produce them, new designs will be necessary. However, I share the view that our present designs are up to the task; they just have not been used for this purpose. We know how to conduct followup surveys of divorce records. We can learn to get transition data from our major surveys if we use them in a truly longitudinal fashion. For example, Leonard Norry pointed out, in his remarks from the floor, that the Annual Housing Survey now returns annually to the same housing units. Moreover, the Current

Population Survey returns annually to half the housing units visited 1 year prior. They can give us longitudinal data on housing units but not on all of the people who live in them. Those who get married or divorced, or get a job, or have another child are likely to have left by the time we return. It is essential to follow them, and experience with such followups shows that it can be done very satisfactorily.

We have good economic accounts in this country and fair demographic accounts. If we make progress in developing data on transitions, we will have gone a long way toward a set of social accounts too. From what I have heard here, the expectations of this conference will not have been met until we have made such progress.

The second point I wish to make is that the work of this conference will not be done until we look not only at women's issues but also at national issues as they impact on and involve women. We have heard that we need statistics on child care, welfare, dependency, and job discrimination and that we need such data for program planning and to keep score on affirmative action. My point is that we also need statistics that answer questions about what is happening to the society as a whole, so that we can understand the data on what is happening to women. This, I take it, is the thrust of Barbara Reagan's call for the examination of societal changes related to the status of women.

In the past 10 years, the largest birth cohorts in U.S. history have been finishing school and entering the labor market. This has occurred at a time of extraordinary demands from women of all ages for jobs and careers and rising demands from minorities for the same things. And, all this has happened at a time of unusually slow economic growth—at times, a recession.

We will not understand the implications of these developments for young people, for women, for minorities, or for anyone else, until we ask and answer the following questions: What has happened over the past 10 or 20 years to the match between qualifications and entering job levels? What has happened to the pace of advance from entering level to journeyman level? What has happened to the aspirations and expectations of new workers as they compare their experience with that of their older colleagues? What has happened to their sense of their own future and their commitment to the system? Richard Easterlin has suggested that clues to some of these questions may be found in high unemployment and relatively lower incomes of young people, later marriage, lower childbearing, and suggestions of rising social pathology [2].

In summary, we need to keep score, and we need to plan. But the correction of inequities and the meeting of needs will

be worked out within social and economic systems that have dynamics of their own. We also need statistics and research

that will tell us more about how these systems are working and how they are likely to change.

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PUBLIC POLICY ON STATISTICAL ISSUES RELATING TO WOMEN

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This conference was designed to examine the data needs and concepts relating to the status of women in order to insure that reliable and useful information is obtained. "It is essential that statistical data be available for making sound legislative decisions, for studying institutional changes, and breaking down discrimination barriers." I see the Census Bureau as being central to achievement of most of these objectives, but the Federal Government as a producer of statistics relating to women includes many other departments and agencies not mentioned in our 2 days of deliberation. For example, I have three case studies under the category that I will call "Income, Occupation, and Employment":

1. Billions of dollars are being spent to create Public Service Employment jobs under the Comprehensive Employment and Training Act (CETA). These funds are allocated to State and local governments. Thousands of women will be channeled into jobs that may or may not enable them to make the transition later into private sector jobs. Impact analyses of these programs, longitudinal tracking programs, and MIS systems at the local level are all a part of the statistical and analytical apparatus of these CETA programs.
2. For more than 10 years, the Equal Employment Opportunity Commission has collected a vast amount of data, by sex, race/ethnicity, industry, occupation, and geographic location from employers and unions. Recently, data on part- and full-time work and wages have been added to questionnaires submitted by State and local governments. I do not know whether the instruments designed for higher education, other educational institutions, include these data. The EEOC is an agency with a sizeable statistical system that has not been examined by researchers to determine whether it is consistent with measures used elsewhere or whether there are useful additions. This EEOC data base is an alternative statistical system that would enable us to study institutional changes and to design procedures for the reduction of employment discrimination.
3. About 1.5 billion dollars will be spent on experimental demonstration and employment programs for youth. The links between school and work, career development, health status, and child care are critical ones. (I hope that the program managers understand that there are both female and male unemployed teenagers.) Also, recommendations from the Commission on Unemploy-

ment Statistics, Commission of Minimum Wages, will be significant for women workers.

Thus, although the Census Bureau is to be applauded for this initial effort of convening a conference of users and producers of statistics, I see, as a next step, the necessity to take an inventory across all Federal agencies on what kinds of data they now collect on women (of all socioeconomic groups) and how these data are related to the major ongoing statistical series (CPS, census, Social Security, (LEED)). There are enormous data banks on women at the Civil Service Commission and the Defense Department. How do these internal Government data sources complement vast amounts of data on women now being collected by research organizations (undertaking large-scale survey work with Government funding—RAND, Mathematica, Urban Institute, and Survey Research Center at Michigan)?

Who should do this inventory and make the findings available to a variety of groups and individuals? The statistical agency that Secretary Kreps mentioned in her keynote speech is a logical place to begin. What is more important is what kind of mechanism can be established now to begin to monitor, evaluate, assess, and, perhaps, modify the Federal statistical effort. Should it be an external advisory group working with an interdepartmental task force? How can these issues remain visible? Need such a group have liaison with the White House and the Congress? What kinds of followup activities should flow from this meeting? Have we identified all of the priorities? Every participant at these sessions should be sent a sample questionnaire asking him or her to comment on critical issues, deficiencies in data, sources of new data, and stories to be told. After these proceedings are released in a form that nonacademics understand, similar comments from women's organizations and professional groups should be sought.

Another question is how can statistical treatment of data, which may be of enormous significance sometime in the future, be brought to the attention of decisionmakers? I was struck by the fact that no mention has been made in the conference of "reverse discrimination," which I define as the perception by some individuals that other individuals are advancing at their expense. How does a statistical system respond to this issue? Were adequate data available to have anticipated an issue that would have been so divisive in the larger society?

How can we more effectively utilize the data that are already available? How can we initiate dialogue between the decision-

makers and those from the external social science research community who could be helpful? How can we achieve some of the objectives of this conference, given certain budgetary constraints? Publication of proceedings cannot be the final phase of this effort. Some standing or ad hoc committee should meet with Secretary Kreps to identify the options,

costs, benefits, and future courses of action. Some of the findings from this conference could shape the lives of women during the next century. Thus, I see action and advocacy, as well as statistical talent, as being basic ingredients for formulating a future program. We have heard from the data users. The data producers must now respond.





***X.
Summary and
Agency Responses***

THE UNIVERSITY OF CHICAGO PRESS

THE UNIVERSITY OF CHICAGO PRESS
54 EAST LAKE STREET
CHICAGO, ILL. 60601



PRINTED IN THE U.S.A.

IN RETROSPECT: SUMMARY AND ISSUES

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Conference Coordinator

The charge for this conference was to consider the status of women and related societal changes and then to suggest additional data needed in Federal statistics or additional tabulations of data already being collected. Secretary Kreps also asked us to remember the practical constraints of confidentiality, limited money, sample reliability, limited public willingness to provide data, and the limited space to publish analytical detail as we explored the changes so greatly needed.

This was a conference whose time had come. Clearly, all felt the urgency of the questions raised.

The discussions had an immediate effect on the Government statistical representatives. The immediate effect and an idea of future effects are reflected in the agency responses in this part of the report. For example, note the efforts made since the conference to provide separate estimates of income from (a) alimony payments and (b) child support. Many of the other suggestions, such as new household typologies, are being considered following the conference but will take longer to implement even though no new data are required. Subsequently, there should be a further ripple effect through the association of participants with others and the publication of this report.

This conference brought together statistical policymakers and a sample of the most outstanding among the academic researchers across the country who had been working on various topics relating to women—occupation, income, education, health, household and family issues, and discrimination. These topics really are not mutually exclusive, and the discussion interrelated them throughout the 2-day conference.

Papers and formal discussion were commissioned among academic researchers. Producers of statistics were not used as formal discussants of the conference papers, because the Steering Committee felt that these issues crosscut the statistical producers from various agencies, and time could not be allotted in a formal way to each statistical producer. However, the invitations carefully asked for representatives from each of the major statistical agencies. Papers were sent out to the participants in advance so that a large proportion of program time could be set aside for formal and informal discussion of the concepts, alternative ideas, gaps in the papers, and related ideas. The floor discussion provided opportunities for the data producers to answer, "We've been working for this for years, and we do agree it's important," or, "Yes, but it isn't practical." The discussion included cost considerations, confidentiality problems, and practicality issues, as well as the

overwhelming needs we all saw for coping with change and having statistics respond to change.

Most importantly, paper writers and formal discussants were asked to revise their papers for publication in this volume to reflect the discussion from the floor and to respond to it. Therefore, this volume, although based on the proceedings of a conference, is not a verbatim transcript. It is far more. Furthermore, after the conference, the data producers at the Bureau of the Census, the Bureau of Labor Statistics, and the National Center for Education Statistics prepared responses to those conference issues appropriate to the concerns and missions of their agencies; these agency responses are presented in this section. Thus, we hope that this volume will be useful to data producers and users on the important topics of what statistics are needed to be able to assess the status of women in this country, to estimate women's probable future, and to eliminate any deficiencies.

As a background for the responses of the statistical agencies, the highlights of the discussion are summarized here to focus on the issues.

The overarching problem noted was the constraint imposed by conscious and unconscious acceptance of outmoded stereotypes. Nearly all of the papers called attention to the changing patterns in households, families, and labor force participation which make inappropriate the former assumptions underlying analytical paradigms in research relating to American women.

The major trends discussed were the increase in one-person households, particularly among the young; the shifting composition of family units over time (not, let me stress, a lessened importance of the family, but family re-formation over time); the increase in multi-earner families; and the importance of women in the role of the only breadwinner in a family with dependents.

Four examples of the many stereotypes that no longer fit are as follows:

1. A family has a single head.
2. The male breadwinner has dependents, including his wife.
3. Women workers are secondary workers in the labor force, with the implication of second-best jobs for secondary workers.
4. Life is made up of three distinct stages: Education, work, and retirement with enjoyment.

Data needs and other issues relating to women called for by the conference participants are presented in the following outline.

ISSUES IN FEDERAL STATISTICAL NEEDS RELATING TO WOMEN

A. Longitudinal Data Needed

1. Data to study changing patterns of labor force behavior by sex, especially occupational mobility, job turnover, gaps in employment and mobility, the transitions among employment, unemployment, and nonparticipation, the duration of these states, and factors influencing them.
2. Data on public service jobs under CETA and special programs for employment and education of youth, and the transition of these workers into the private sector, classified by sex.
3. Income-sharing information, as well as data on individual earnings by sex over time.
4. Data on the rapidity of household change and how individuals move over time among various types of households, and the average length of the interval which adults and children spend in different types of households.
5. Statistics on career paths of academic personnel at all educational levels and on educational development by sex.
6. Data on health status and health care.

The possibility of meeting longitudinal data needs by merging CPS data with Social Security and IRS data, of course needing to protect confidentiality, was raised. Combination of the CPS sample into a longitudinal file was suggested.

B. Cross-Section Data—New Data Needed

1. BLS establishment data including turnover data by sex, race, and major occupation (three-way classification).
2. Data on employer attitudes collected from time to time along with establishment data.
3. Job vacancy data.
4. Counts of public service officials by sex and race (two-way classification).
5. Data on fringe benefits and pensions by sex of recipient.
6. The use of occupation data would benefit from measures of variation in skill requirements within groups, studies on the consistency of employer and employee classifications of occupation, and a standardized occupational classification system.
7. Data on nonmarket productive activities, including time input, and on the wages that would be required to draw homemakers into the paid work force (i.e., reservation wages).
8. Information on the use of child-care facilities by age of child, marital status and occupation of parent(s), cost of care, and location of facility.
9. Separate data on income from child-support payments and from alimony payments, along with information on the amount of such support payments due.
10. Data on economic arrangements of divorce by State.
11. Data on fraternal or paternal support for children, as well as maternal.

12. Data on the extent and financing of abortion services, factors affecting supply and demand of these services, and links to subsequent births.
13. Measures of the duration and replication of certain statuses, such as poverty status or single-parent family status, to quantify the dynamic processes for policy formulation.
14. Data on the physical and mental health status of women of all ages.

C. Cross-Section Data—New Tabulations Needed of Currently Collected Data

1. Data on new household typologies. The version suggested at the conference classifies households as single-person units, couples, parent-child units (subdivided by one and two parents), three-generation units, etc. This typology emphasizes the childrearing unit and can be built up from questions already being asked.
2. Separate income breakdowns for men and women for various household types.
3. Data on the flow of students from secondary to higher education by sex, race, and income (three-way classification).
4. Data on average or median wage rate by occupation, sex, and race (three-way classification).
5. Statistics on hours of work by sex, and on the availability of part-time and flex-time jobs.
6. Occupational data at the three-digit level on an annual basis by sex and race (two-way classification).
7. Monthly data on occupation by industry, race, and sex, and on occupation by age, race, and sex (three-way classifications).
8. Local or regional data on unemployment rates for occupation by sex and race (two-way classification), and local data on job vacancies.
9. Data should be presented by age cohort.
10. Wherever appropriate, data should be classified by age and race as well as sex (three-way classification).
11. Tabulation plans for the 1980 census should reflect response to this conference.

D. Other Issues

1. An inventory should be made across all Federal agencies on data collected on women of all socioeconomic groups and how such data relate to the major ongoing series.
2. Communication should be improved concerning what data are available to elucidate issues relating to women.
3. Gender-specific terms should be removed.

Why is it that this conference wants these changes? Let me summarize some of the reasons. Data concepts and definitions, as well as the choice of the paradigm, influence both the questions asked and the answers found. We want changes to permit statistical analysis of men and women's economic situations, equality of opportunity, and barriers to equal advancement opportunities.

We want to provide an adequate basis for analysis of discrimination by sex in the marketplace. We want to see research that will avoid a demeaned status for women in either the terms used or the analytic model used. We want to monitor support patterns for children. We want to provide a useful basis for policy questions related to equity, income or earnings distributions, and distribution of wealth and property rights.

Changes in the data collected and tabulations made are necessary if we are going to progress beyond hypothesis generation and description of results of dynamic processes. We have said very little about the timing of change, except to express hope that tabulation plans for the 1980 census will reflect response to this conference.

Academic researchers and policymakers may well talk past each other unless we recognize our differences. Academicians have the great opportunity to consider options broadly in all their diversity, and from this may come imaginative policy suggestions. In fact, however, many academicians are captives of those models that are thought to yield the greatest expected academic respect, and thus, they perpetuate analysis and policy prescriptions that are based on sometimes ill-fitting

assumptions. This is a reasonable, rational description of the constraints under which academicians operate. Policymakers, on the other hand, are constrained to a time frame that has a heavy payoff for short-run solutions and instant analysis. Also, they have a view of options to be considered that is heavily conditioned by the path of what is deemed to be politically feasible. Thus, we may, if we don't watch out, talk past each other.

With thanks to our increased computer capabilities, to those who see their professional responsibilities as moving back and forth between the two worlds of academic social science researcher and political policymaker, and to those that are committed to expediting such movement, this conference demonstrates that we can work together to bring academicians and statistical policymakers into more effective focus. We hope this volume will help statistical producers and data users deal on a timely basis with the adjustments in data collection and tabulation needed now in light of major social and economic phenomena of our time—the movement of women into the work force in unprecedented proportions, the shifting composition of family units over time, and a new consciousness of women's status in America.

RESPONSE TO THE ISSUES

Bureau of the Census

A. Longitudinal Data Needed

Item 1. Data to study changing patterns of labor force behavior by sex, especially occupational mobility, job turnover, gaps in employment and mobility, the transitions among employment, unemployment, and nonparticipation, the duration of these states, and factors influencing them.

Response. The Census Bureau is currently planning for a proposed new project, the Survey of Income and Program Participation (SIPP), which would become operational in the early 1980's. It is anticipated that the major subject content of this survey, or series of surveys, would include money and nonmoney income, wealth and assets, participation in Government income transfer programs, work experience, and selected disability and health topics. Current plans call for the program to have a longitudinal component, including following households which move during the period and interviewing a portion of the sample for 2 or more years. The basic design calls for five (or six) quarterly interviews with the same household. Such a program, when instituted, would meet many of the needs mentioned in relation to longitudinal work experience and earnings data.

Also, there is potential for providing more timely information on labor force behavior from the Current Population Survey (CPS) gross flows data, but further investigation of the potential problems, including rotation group bias and response variation in the CPS, is warranted. This is one of the issues being addressed in a study currently underway to investigate potential methodological problems in the CPS.

Merging CPS data with Social Security and IRS data would produce only a limited longitudinal file. Since a household is in the CPS for 4 months, out for 8 months, and back in for 4 months, only a limited time frame is available. It should be noted that a voluminous amount of work on matching these files has already been done in (a) the 1963 Pilot Link Study and (b) the 1973 Match Study. The Population Division of the Census Bureau has some materials on the results from both of these studies, as does the Social Security Administration.

Item 3. Income-sharing information, as well as data on individual earnings by sex over time.

Response. There currently is not much information available on income jointly received by members of a family or household. One notable exception is the reinterview for the Survey of Income and Education (SIE), which identified shared income for several types of income (e.g., self-employment, Social Security and Railroad Retirement, Supplemental Security Income, dividends, interest, and rent). These data should have high validity because of the detailed nature of the reinterview. However, there are limitations since the sample was small (9,000 designated housing units) and was concentrated in low to moderate income households, and the data are available only for 1976.

The SIPP mentioned above would collect data on shared income. Also, statistics on total money income and on wage and salary income by sex are available annually from 1947 to the present from the CPS; data on earnings by sex are available from 1948. These data are published in *Current Population Reports*, Series P-60, "Consumer Income."

Item 4. Data on the rapidity of household change and how individuals move over time among various types of households, and the average length of the interval which adults and children spend in different types of households.

Response. We are attempting to incorporate the questions necessary to provide this information in the planning stages for the SIPP. If we are successful, SIPP will collect information on length of time in household. The proposed longitudinal component of SIPP, which would follow movers, would answer these needs.

Item 5. Statistics on career paths of academic personnel at all educational levels and on educational development by sex.

Response. We assume this item refers to a suggestion that statistics be gathered on the number of teachers and professors by rank, institutional type, and sex, so that studies could be conducted on the career progress of women who work in educa-

tional institutions. The Census Bureau will provide some limited statistics on the characteristics of teachers in the 1980 census occupational reports. However, a special series of surveys would be required to provide all the data needed. We are not aware of any such plans at the present.

Item 6. Data on health status and health care.

Response. No real longitudinal data on health status or care exist at present, but the new Medical Expenditure Survey, conducted by the National Center for Health Statistics, collects health status information several times during the year in which respondents are in sample. It should also be noted that the Survey of Income and Program Participation (SIPP) potentially could provide data of a more truly longitudinal character.

B. Cross-Section Data—New Data Needed

Item 4. Counts of public service officials by sex and race (two-way classification).

Response. There is work underway to increase the detail of occupational classification for public administration employees for use in the 1980 census. It is not feasible for the Census of Governments to collect such data, because the information is derived by the State and local governments from payroll records, which normally do not contain sex or race information.

Item 5. Data on fringe benefits and pensions by sex of recipient.

Response. The proposed Survey of Income and Program Participation (SIPP) would provide data on several sources of nonmoney income, including fringe benefits, for persons at all income levels. Data on pension income for women and men are currently available from March Current Population Surveys. These data identify the source of the pension income (private, Federal, State, or local) and age of the recipient.

Item 6. The use of occupation data would benefit from measures of variation in skill requirements within groups, studies on the consistency of employer and employee classifications of occupation, and a standardized occupational classification system.

Response. There has been some private research in the area of variability within census occupation groups. This research utilized a sample file which contains *Dictionary of Occupational Titles* codes and scores and census occupation codes. It is hoped that such a file will also be available after the 1980 census.

The 1970 census evaluation study, titled *The Employer Record Check* (PHC(E)-12), did provide information on the consistency of employer and employee reports on occupation. However, such a study is not planned in connection with the 1980 census.

The Census Bureau will base its 1980 census occupation classification on the *Standard Occupational Classification Manual*, issued in January 1978 by the Department of Commerce, Office of Federal Statistical Policy and Standards.

Item 7. Data on nonmarket productive activities, including time input, and on the wages that would be required to draw homemakers into the paid work force (i.e., reservation wages).

Response. The organization, ACTION, has conducted at least one survey of volunteer work. Some independent research on "reservation wages" has been done using the National Longitudinal Surveys, under the direction of Ohio State University, Center for Human Resources Research.

Item 8. Information on the use of child-care facilities by age of child, marital status and occupation of parent(s), cost of care, and location of facility.

Response. The 1974 October Current Population Survey included questions on child-care arrangements of children 3 to 6 years old which resulted in a publication of characteristics of children attending day-care centers by age, and by marital status and employment status of the mother. No information was collected on cost or location. The National Longitudinal Surveys, mentioned previously, also have included questions on child-care arrangements. The proposed SIPP survey may collect more detailed statistics on child-care arrangements, but these data probably would not be available until the mid-1980's.

Also, analysis (by Harriet Presser and Mary Powers) of the June 1977 supplement to the CPS provided information on the potential use of child-care facilities under certain contingencies.

Item 9. Separate data on income from child-support payments and from alimony payments, along with information on the amount of such support payments due.

Response. Separate data on income from child-support payments and from alimony, and data on such support payments due, would be available in the future from the Survey of Income and Program Participation (SIPP). Currently, very limited data on the amounts of alimony and child-support payments received have been tabulated

from the 1976 Survey of Income and Education (SIE) and the CPS. More extensive data, including some State data, were tabulated from the SIE and published in a report released in June 1979. To address the issue of the amount of alimony and child-support payments due, as well as other issues, current plans call for separate supplements to the CPS in April 1979 and April 1981. However, to obtain very detailed data at the State level, a multimillion-dollar follow-on survey to the 1980 census would be required.

Item 10. Data on economic arrangements of divorce by State.

Response. We had planned to obtain such information from a follow-on survey connected to the 1976 SIE, but the funding was not approved. As was mentioned in the previous item, a multimillion-dollar effort would be required to derive these data for States.

Item 11. Data on fraternal or paternal support for children, as well as maternal.

Response. As distinguished from the alimony/child-support issue, such information probably would require a "kin network survey." It is possible that, in the near future, the Bureau would be able to get funding for such a study.

Item 12. Data on the extent and financing of abortion services, factors affecting supply and demand of these services, and links to subsequent births.

Response. The National Survey of Family Growth, sponsored by the National Center for Health Statistics, did include questions on abortion. Also, the Center for Disease Control does maintain counts of legal abortions by selected characteristics. However, survey researchers within the Federal Government generally are wary about asking questions on such a controversial and emotional issue.

Item 13. Measures of the duration and replication of certain statuses, such as poverty status or single-parent family status, to quantify the dynamic processes for policy formulation.

Response. A detailed classification of single-parent families in poverty is available annually from the CPS, but no longitudinal data are available at present. The SIPP would provide longitudinal data, since it would enable researchers to examine the effect of participation in various Government transfer programs and other factors on the duration and replication of poverty.

The whole area of durations in various status categories is more a question of analytic

approach than a data collection problem. There is currently much interest in the "life-course" analysis method, and we will be attempting to design tables that can be used in such analyses.

Item 14. Data on the physical and mental health status of women of all ages.

Response. The Health Interview Survey and the Health Examination Survey, sponsored by the National Center for Health Statistics, provide data on physical health status. Certain questions on depression have been included in the Health Examination Survey and on the 1978 Disability Survey, sponsored by the Social Security Administration. The National Institute of Mental Health is working on the development of measures of mental disorders.

C. Cross-Section Data—New Tabulations Needed of Currently Collected Data

Item 1. Data of new household typologies. The version suggested at the conference classifies households as single-person units, couples, parent-child units (subdivided by one and two parents), three-generation units, etc. This typology emphasizes the childrearing unit and can be built up from questions already being asked.

Response. New household typologies are being developed to coincide with our new relationship question for the 1980 census. They may not be in the exact form suggested, but our method of disaggregating will allow for analysis of the types cited. We likely will publish such information in the series of subject reports based on the 1980 census.

Item 2. Separate income breakdowns for men and women for various household types.

Response. Income distributions for men and women, by relationship to the family head, are available annually since 1947 from the CPS. In the past, income data by type of family have followed a fairly rigid classification: Husband-wife; male head, no wife present; and female head, no husband present. Since family and household structure has undergone pronounced changes, additional tabulations are being programmed and most likely will appear in an upcoming income report. Some of the categories in these tables are two-parent and one-parent families with only one child present, married couples, and families with subfamilies present; and for unrelated individuals, those who are unattached (single), living in group quarters, or other.

Item 3. Data on the flow of students from secondary to higher education by sex, race, and income (three-way classification).

Response. The Census Bureau has been requested in the past to tabulate year of high school graduation by income, sex, race, and whether enrolled in college for several CPS years to assist in a study of the social characteristics of first-time college students. However, these tables were not run because of the great cost involved. Although a limited amount of information on year of high school graduation has been published in annual CPS reports, the detailed tabulations requested have not been completed because of the cost and the limitations of sample size in the CPS. However, a great deal of information on college enrollment by age is currently available and should provide a reasonably accurate description of the changes in college enrollment by social characteristics of students. Further analysis of these data is now underway in the Census Bureau.

Item 4. Data on average or median wage rate by occupation, sex, and race (three-way classification).

Response. This information will not be collected directly in the 1980 census. However, using the earnings and weeks worked data with the new usual hours worked question, better approximations can be made. Wage rate questions are asked in the CPS, and the data are published by the Bureau of Labor Statistics.

Item 5. Statistics on hours of work by sex, and on the availability of part-time and flex-time jobs.

Response. Decennial censuses and the CPS provide data on hours worked by sex and race. If "work schedule" data are needed, the Bureau of Labor Statistics is the appropriate source. Also, data on the availability of part-time and flex-time jobs would need to be collected through establishment surveys.

Item 7. Monthly data on occupation by industry, race, and sex, and on occupation by age, race, and sex (three-way classifications).

Response. The sample size of the CPS would not permit reliable tabulation of detailed distributions on a monthly basis.

Item 8. Local or regional data on unemployment rates for occupation by sex and race (two-way classification), and local data on job vacancies.

Response. The 1980 census will provide local data on unemployment and occupation by sex. Some local data on unemployment, occupation, and job vacancies are currently available from the Bureau of Labor Statistics.

Item 9. Data should be presented by age cohort.

Response. There is interest in doing an age cohort report based on data from the 1960, 1970, and 1980 censuses, but there are no firm plans at this point.

Item 10. Wherever appropriate, data should be classified by age and race as well as sex (three-way classification).

Response. Plans for 1980 census publications and reports in the *Current Population Reports* series are responsive to these needs.

Item 11. Tabulation plans for the 1980 census should reflect response to this conference.

Response. The input received at the conference, as well as comments and suggestions from various groups of users, is a major resource in our preparation of tabulation plans for the 1980 census and other data collection activities.

D. Other Issues

Item 1. An inventory should be made across all Federal agencies on data collected on women of all socioeconomic groups and how such data relate to the major ongoing series.

Response. The Office of Federal Statistical Policy and Standards potentially could initiate an agency-wide inventory. Abundant descriptions of Census Bureau data products are available from our Data User Services Division.

We have compiled a reference sheet detailing selected reports containing data on women published by the Census Bureau. In addition, the report, "A Statistical Portrait of Women in the U.S." (*Current Population Reports*, Series P-23, No. 58), is currently being updated and is scheduled for release in the fall of 1979.

Item 2. Communication should be improved on what data are available to elucidate issues relating to women.

Response. The conference itself helped to serve this purpose. Also, our Data User Services Division has made major efforts in this area and will continue to do so.

Item 3. Gender-specific terms should be removed.

Response. Unnecessary gender references have been removed from publications and other documents.

RESPONSE TO THE ISSUES

Bureau of Labor Statistics

A. Longitudinal Data Needed

- Item 1.** Data to study changing patterns of labor force behavior by sex, especially occupational mobility, job turnover, gaps in employment and mobility, the transitions among employment, unemployment, and nonparticipation, the duration of these states, and factors influencing them.

Response. Current Population Survey (CPS) data on occupational mobility by sex and race were published by BLS for 1965-66 and 1972-73 and will be available for 1977-78 in 1979. Data on job tenure were published for 1965-66, 1967-68, and 1972-73 and are now available for 1977-78. Information on the job search of the unemployed is available for 1972 and 1976, and of the employed for 1976. BLS reports on the gross flows of men and women in and out of the labor force were published in 1963, 1968, and 1977. BLS and Census Bureau staff are seeking ways to reduce known biases in the gross flow statistics, so that the data can be published on a more timely basis.

B. Cross-Section Data—New Data Needed

- Item 1.** BLS establishment data including turnover data by sex, race, and major occupation (three-way classification);
- Item 2.** Data on employer attitudes collected from time to time along with establishment data;
and
- Item 3.** Job vacancy data.

Response. A nationwide sample survey of some 160,000 business establishments is conducted each month by BLS with the cooperation of the States. Data on the number of employees in industries, their hours, and earnings are compiled, analyzed, and published by BLS monthly, quarterly, and annually. Most data are from employers' payrolls, and some data series are not collected by sex. In June 1978, BLS began publishing seasonally adjusted monthly numbers of employed women in 39 industries. This is in

addition to the estimates published each quarter for women on the payrolls of 402 of the 419 industries covered in the nationwide survey.

There are a number of unique factors that circumscribe BLS' freedom of action with respect to the establishment survey. First is the availability of funds. The collection of statistics for subgroups of the population can be extremely expensive, because sample sizes must be expanded as the size of the group to be represented gets smaller. Second is the availability of records. Most establishment data are collected directly from payroll records. Where payroll records do not contain employee sex identification, these data cannot be collected. In recent years, employers—partly in response to equal rights legislation—have removed identifying symbols from payroll records. Frequently, separate records are kept to comply with various laws, but these records do not contain the payroll hours, earnings, and employment data required by BLS. Thus, many employers are unable to relate the different statistical records in a satisfactory manner. Third is the cooperation of respondents. The BLS does not have general authority to compel respondents to provide us with the data required. We rely on the voluntary cooperation of respondents. Many well-intentioned employers cannot or do not wish to spend the time required to provide additional data or to reprogram their entire recordkeeping system in order to fulfill a BLS request. Experimental work in some areas has indicated that the response rates for an entire survey can be adversely affected by requests for too much detail or for data considered by the company to be particularly sensitive.

Today, BLS collects and publishes labor turnover data for all employees on manufacturing payrolls and three nonmanufacturing industries (metal mining, coal mining, and communications). Between 1958 and 1968, turnover data for women employees in manufacturing were collected monthly and published quarterly. The collection of the women's data was discontinued in 1969 when job vacancy statistics were introduced and resources would not permit the collection of both data series. The job vacancy series was discontinued in December 1973.

The problem of reintroducing both of these series is a major one, requiring each State agency's approval of changes in the collection instrument, as well as a large expansion in our resources. Currently, BLS is planning to explore both issues by means of a pilot survey to be conducted in four States (Texas, Florida, Utah, and Massachusetts) in the spring of 1979.

- Item 9.** Separate data on income from child-support payments and from alimony payments, along with information on the amount of such support payments due.

Response. BLS has published the number of recipients of such payments from data obtained in the CPS income supplement each March but has been unable to obtain separate dollar values because of the way the data are combined on the questionnaire. Based on test results in April 1978, the Census Bureau has collected, on an experimental basis, income data for child-support and alimony in a CPS supplement for April 1979. Currently, BLS does not obtain separate expenditure and income data for child-support and alimony in its Consumer Expenditure Survey. This procedure is being reviewed in light of the new developments in the CPS.

Response. BLS has published statistics on the numbers and proportions of high school graduates who go on to college by sex since 1959, and by sex and race since 1967. Data for 1978 on school enrollment by sex and race are now available.

- Item 4.** Data on average or median wage rate by occupation, sex, and race (three-way classification).

Response. Earnings data are obtained for the BLS by the Census Bureau through the Current Population Survey (CPS) and are published by sex, age, marital status, race, occupation, union-nonunion status, and other characteristics. Unpublished data are available on request. Data on weekly earnings were first collected in May 1967 and 1969-78, and data on hourly earnings in May 1973-78. BLS plans to replace the May series on weekly and hourly earnings with a quarterly and annual average series in 1979.

Through its Industry and Area Wage Survey programs, the BLS publishes data on average, straight-time hourly or weekly earnings and earnings distributions by occupation in selected industries and in 70 metropolitan areas. Earnings are published separately by sex except when the data are inadequate to provide reliable estimates. Personal characteristics other than sex are rarely available from establishment payroll records, as discussed in the BLS response to B-Item 1, above.

C. Cross-Section Data—New Tabulations Needed of Currently Collected Data

- Item 1.** Data on new household typologies. The version suggested at the conference classifies households as single-person units, couples, parent-child units (subdivided by one and two parents), three-generation units, etc. This typology emphasizes the childrearing unit and can be built up from questions already being asked.

Response. For the past several years, BLS staff have been actively pursuing changes in the collection, analysis, and publication of data on households and families. We were instrumental in having the collection of CPS data discontinued on the basis of an outdated "head of household" concept (as of October 1978). In 1977, BLS eliminated the use of the term "head" in connection with all CPS data for husband-wife families. In July 1977, BLS introduced quarterly statistics on the employment status and interrelationships of individuals in families, and in 1978, these statistics were published monthly. BLS staff are continuing to explore new ways to classify both the monthly data and the long-standing marital-family data from the annual March CPS supplement.

- Item 3.** Data on the flow of students from secondary to higher education by sex, race, and income (three-way classification).

- Item 5.** Statistics on hours of work by sex, and on the availability of part-time and flex-time jobs.

Response. Data on hours worked per week are available from the CPS for 1948 forward and on part-time work for 1954 forward. Information on usual weekly hours, work schedules (number of days per week, shift work, and beginning and ending hours) has been collected in May beginning in 1973. A series on time lost from work as a result of illnesses, injuries, and miscellaneous reasons (excluding vacations, holidays, labor disputes, and bad weather) is available for May 1973 forward. BLS generally publishes hours statistics by sex, age, marital status, occupation, industry, union-nonunion status, and other characteristics, with unpublished data available on request.

- Item 6.** Occupational data at the three-digit level on an annual basis by sex and race (two-way classification);
and

- Item 7.** Monthly data on occupation by industry, race, and sex, and on occupation by age, race, and sex (three-way classifications).

Response. Since 1975, annual average CPS data at the

3-digit level have been published each year for some 200 occupations by sex and race. These data have been available on an unpublished basis since 1962. Currently, tables published monthly feature major occupations by sex and age and by sex and race. Data on major occupation by industry group are published monthly for all employed persons, with unpublished data by sex and race available on request.

- Item 8.** Local or regional data on unemployment rates for occupation by sex and race (two-way classification), and local data on job vacancies.

Response. In 1967, BLS began publishing annual average CPS data on the labor force, employment, unemployment, and unemployment rates by sex and race for the 10 largest States and 20 metropolitan areas. By 1976, annual average data by sex were available for all 50 States, the District of Columbia, and 30 metropolitan areas. Unemployment rates by sex are not published monthly because sample size precludes reliable estimates on a local or regional basis.

- Item 9.** Data should be presented by age cohort.

Response. Although age cohort data by sex are not part of the BLS regular data series, they are included in various special studies, such as those on work-life expectancy and labor force projections. Currently, BLS staff are engaged in research on age cohort methodology for use in new studies on earnings.

- Item 10.** Wherever appropriate, data should be classified by age and race as well as sex (three-way classification).

Response. At present, over 80 percent of the CPS data published by BLS are presented by sex and about 40 percent by race. Age is frequently included in sex and race tables. Upon request, unpublished data by sex and race are provided to users. Moreover, BLS is always willing to consider expanding the publication of presently unpublished data if resources permit.

As in past years, BLS policy requires that breakdowns by sex and race be considered in all new program designs. However, the principal deterrent to publication of certain details from the CPS by sex and race is that some of the sample numbers are too small to be statistically reliable. Logistical considerations of publication cost, space, and time factors, as well as the

limitations on clerical and computer resources, also impose some finite limits on the amount of data published. Nevertheless, where a demonstrable need exists for an expansion of publication tables, this can often be accomplished.

D. Other Issues

- Item 1.** An inventory should be made across all Federal agencies on data collected on women of all socioeconomic groups and how such data relate to the major ongoing series;

and

- Item 2.** Communication should be improved concerning what data are available to elucidate issues relating to women.

Response. To answer our data users' increasing needs for current statistics on working women, we produced two new publications in 1978. The first is the new series of quarterly reports, *Employment in Perspective: Working Women*, and the second is an inventory of all of our women's data, *Where to Find BLS Statistics on Women*, BLS Report 530, 1978. These publications are free upon request. In addition, we have established a new mailing list (BLS-326), especially for persons interested in receiving our publications on working women and on families.

- Item 3.** Gender-specific terms should be removed.

Response. Over the past few years, we have desexed all occupational and other terms—such as changing “man hours” to “work hours”—in all BLS publications.

Two activities should be mentioned that could have a substantial effect on our statistical series over the next decade. First is the National Commission on Employment and Unemployment Statistics, which held its initial meetings in 1977 to reassess the entire labor force statistical system in this country. The Commission continues to hold a series of open, in-depth meetings and to elicit option papers on many of the same issues discussed at this conference. Their final report is due in late 1979. The second activity is that of the CPS Methods Test Panel (MTP). Phase I concerns CPS collection procedures, and plans for Phase II include modifications of CPS questions on discouraged workers, hours worked, and unemployment. The MTP is scheduled for completion in 1980 or 1981. The test results will provide guidance in the redesign of the CPS questionnaire which will incorporate many of the National Commission's recommendations. A large-scale test panel is planned for 1981.

RESPONSE TO THE ISSUES

National Center for Education Statistics

A. Longitudinal Data Needed

Item 5. Statistics on career paths of academic personnel at all educational levels and on educational development by sex.

Response. The National Center for Education Statistics (NCES) has a very adequate data bank of statistics on academic personnel at all levels and educational development by sex. These data are not longitudinal, but they are detailed time series showing (in the aggregate) the numbers, proportions, and salaries of women employees in education by field, rank or grade, type of institution, etc. We also have time series of similar data for women administrators in higher education. Some of our data on numbers and salaries of women go back, with considerable consistency of definitions and categories, to the academic year 1962-63.

All of our enrollment data are broken out by sex.

B. Cross-Section Data--New Data Needed

Item 2. Data on employer attitudes collected from time to time along with establishment data.

Response. Our Vocational Education Data System, which we expect to implement in 1979, will be generating data on employer attitudes on an annual basis. The establishments employing women will be classified and tabulated.

C. Cross-Section Data--New Tabulations Needed of Currently Collected Data

Item 3. Data on the flow of students from secondary to higher education by sex, race, and income (three-way classification).

Response. The data needs described in this item can be met by reference to our National Longitudinal Survey. We have the National Longitudinal Survey of the High School Class of 1972, which is about to be followed up for the fourth time and has an enormous amount of data on the flow of

students from secondary to higher education by sex, race, and income. There are many additional variables also. Our new NLS initiative, High School and Beyond, which has already begun, has a larger population, permitting more subsamples, and will be following two groups, the sophomore and senior classes the same year.

Also, NCES' Census Mapping Project restructures census geographic areas into school district aggregates. This project was carried out using 1970 census data and is also being planned for the 1980 census to provide data for educational administrative areas.

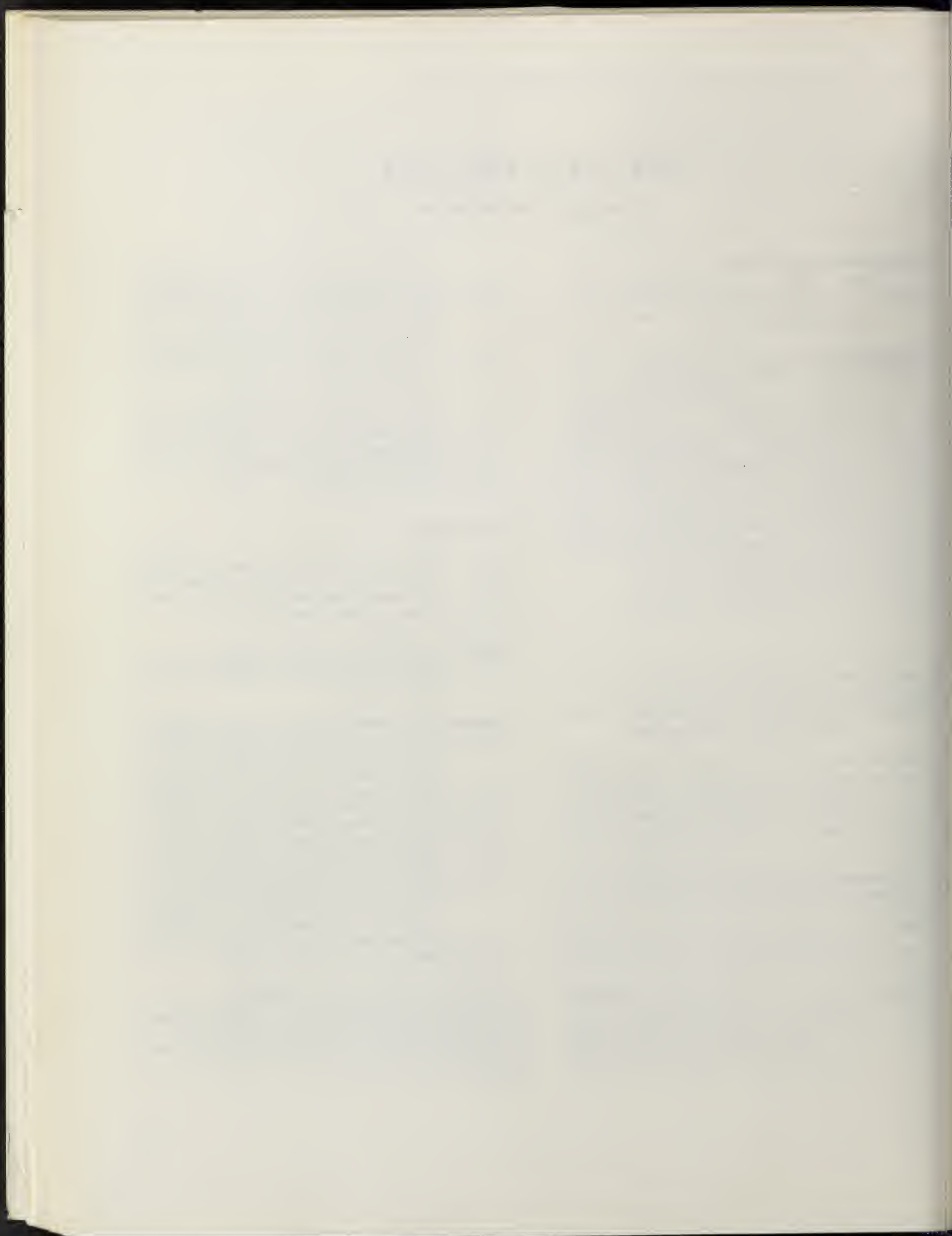
D. Other Issues

Item 1. An inventory should be made across all Federal agencies on data collected on women of all socioeconomic groups and how such data relate to the major ongoing series;
and

Item 2. Communication should be improved concerning what data are available to elucidate issues relating to women.

Response. NCES has a number of activities which will satisfy, in part, the needs described in these two items. NCES is assembling computer tapes of all education data gathered by all Federal agencies. Work has begun on creating consistent formats and structures in relation to these tapes so that they can be utilized by researchers. In addition, NCES has let a contract to produce a computer-based indexing system for all data gathered or planned to be gathered by any Federal agency either addressed to an educational institution or relating to an educational issue. The improvement of communication will come with regular directories and lists of all these data and data bases.

In summary, NCES is quite prepared to assist anyone undertaking efforts to better understand or better communicate the status of women in education, either as students or as employees. It is hoped that the work of the conference will help to publicize and stimulate increased use of these data in the future.





Appendix





PROGRAM

Census Bureau
Conference on
**Issues in Federal
Statistical Needs
Relating to Women**

April 27-28, 1978

LOCATION:

Holiday Inn
8120 Wisconsin Ave.
Bethesda, Maryland

MEETING ROOMS:

Program Sessions—Versailles 1-2
Luncheons, dinner—Versailles 3-4
Hospitality Room—Maryland Room

REGISTRATION:

6:00-10:00 p.m.

Wednesday, April 26—Second Floor Lobby

7:30-8:30 a.m.

Thursday, April 27—Second Floor Lobby

OBJECTIVES

This Conference on Issues in Federal Statistical Needs Relating to Women is the first of its type, designed to examine the data needs and concepts relating to the status of women in order to insure that reliable and useful information is obtained. It is essential that statistical data be available for making sound legislative decisions, for studying institutional changes, and breaking down discrimination barriers. It is anticipated that meaningful discussion of these issues by data suppliers and data users will result in a better understanding of data deficiencies, the design of new statistical series, revision of statistical terminology, where necessary, and delineation of areas for further research and analysis.

CONFERENCE AGENDA

**THURSDAY,
APRIL 27**

8:45-10:00 a.m. Session A—OPENING

- **Call to Order**
Shirley Kallek
Bureau of the Census
- **Introductory Remarks**
Manuel D. Plotkin, *Director*
Bureau of the Census
- **Opening Address**
Honorable Juanita M. Kreps
Secretary of Commerce
- **About this Conference**
Dr. Barbara B. Reagan
Southern Methodist University

10:00-10:15 Coffee Break

10:15-11:15 Session B—INCOME

- **Chair**—Professor Joseph L. Gastwirth
George Washington University
- **Topic**—"Data Needs for Evaluating the Labor Market Status of Women"
Dr. Nancy Smith Barrett
Urban Institute
- **Discussant**—Dr. Isabel Sawhill
National Commission for Manpower Policy
- **General Discussion**

11:15-12:15 Session C—OCCUPATION

- **Chair**—Dr. Janet L. Norwood
Bureau of Labor Statistics
- **Topic**—"On the Use of Occupational Statistics"
Dr. Ronald L. Oaxaca
University of Arizona
- **Discussant**—Dr. Myra Strober
Stanford University
- **General Discussion**

12:15-12:45 p.m. Social Period

12:45-2:45 Luncheon Program

Session D—DISCRIMINATION

- **Chair**—Daniel B. Levine
Bureau of the Census
- **Topic**—"The Use of Federal Data in Combating Discrimination Against Women"
Dr. Barbara R. Bergmann
University of Maryland
- **General Discussion**

3:00-5:00 Session E—HOUSEHOLD STRUCTURE

- **Chair**—Dr. Harriet Presser
University of Maryland
- **Topic**—"Household Structure: Necessary Changes in Categorization and Data Collection"
Dr. Harold W. Watts
Columbia University
and
Felicity Skidmore
University of Wisconsin
- **Topic**—"Household Structure and Welfare: Comments About Data Sources, Data Needs, and Concepts"
Dr. W. Reynolds Farley
University of Michigan
- **Discussant**—Dr. Walter Allen
University of North Carolina
- **Discussant**—Dr. Joan Aldous
Notre Dame University
- **General Discussion**

6:15-7:00 Social Period

7:00-9:15 Dinner Program

- **Chair**—Shirley Kallek
Bureau of the Census
- **Speaker**—
Honorable Barbara A. Mikulski
U.S. House of Representatives

**FRIDAY,
APRIL 28**

9:00-10:00 a.m. Session F—EDUCATION

- **Chair**—Marie D. Eldridge
National Center for Education Statistics
- **Topic**—"Data Pertaining to the Education of Women: A Challenge to the Federal Government"
Dr. Alexander Astin
University of California
- **Discussant**—Dr. Mary G. Powers
Fordham University
- **General Discussion**

10:00-10:15 Coffee Break

CONFERENCE AGENDA—Continued

DAY,
RIL 28—Continued

10:15-11:15 **Session G—HEALTH**

- **Chair**—Dr. Francine D. Blau
University of Illinois
 - **Topic**—"Data Needs Relating to Women's Health"
Dr. Charlotte F. Muller
City University of New York
 - **Discussant**—Dr. David W. Dunlop
Vanderbilt University
 - **General Discussion**
-

11:45-12:15 **Summary of Sessions A-G**

Dr. Barbara B. Reagan
Southern Methodist University

12:15-2:15 **Luncheon Program**

- **Chair**—Dr. Barbara A. Bailer
Bureau of the Census
 - **Speaker**—Sarah Weddington
General Counsel
Department of Agriculture
-

2:30-4:00 **Session H—PUBLIC POLICY ON
STATISTICAL ISSUES**

- **Moderator**—Dr. Courtenay M. Slater
Chief Economist
Department of Commerce
 - **Panel Members**—
Dr. David W. Breneman
Brookings Institution
Mollie Orshansky
Social Security Administration
Dr. Robert Parke
Social Science Research Council
Dr. Phyllis A. Wallace
Massachusetts Institute of Technology
-

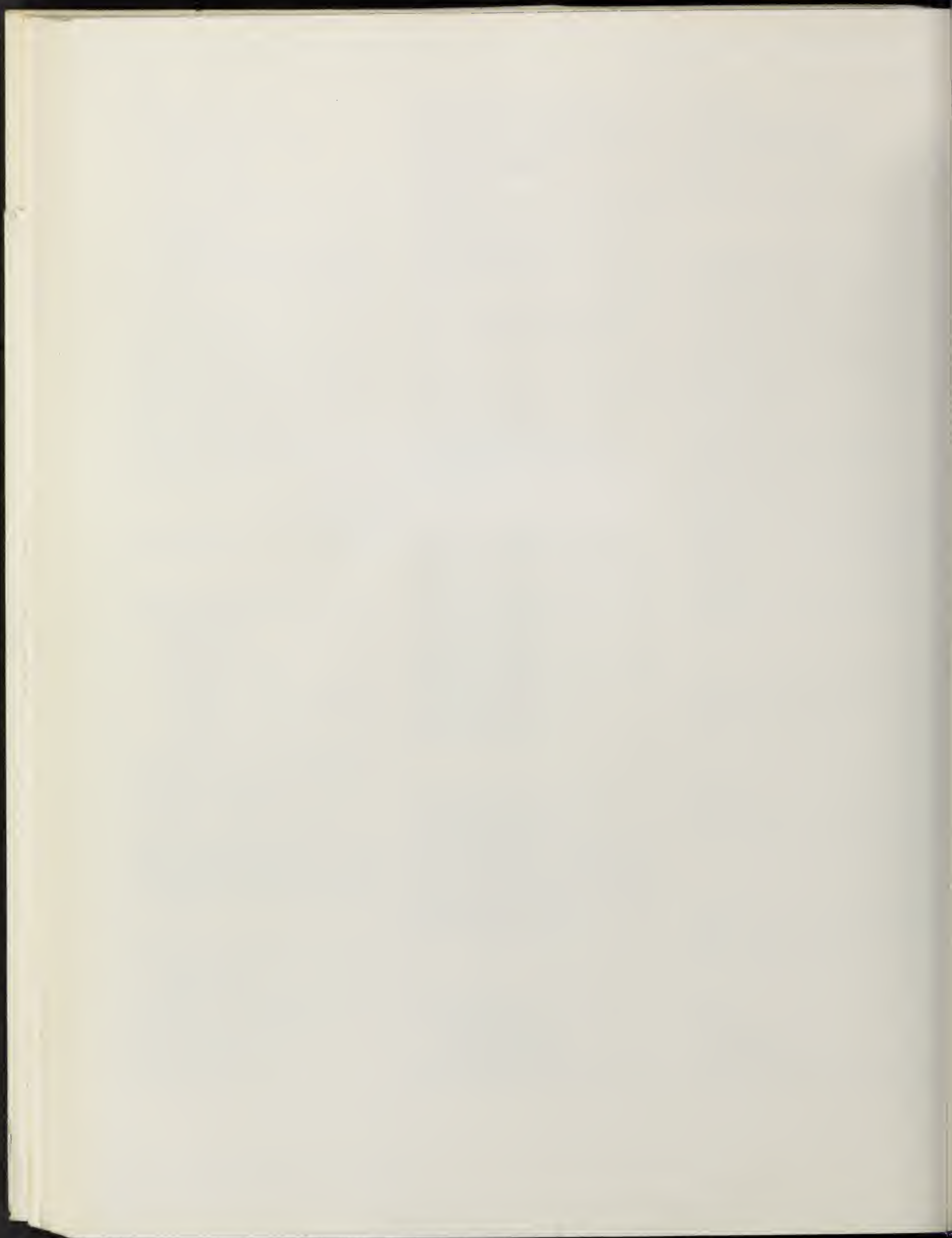
4:00-4:15 **CONCLUDING REMARKS**

Shirley Kallek
Bureau of the Census

4:15 p.m. **Adjournment**

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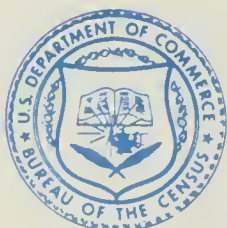
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Chief Economist

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Acting Director



BUREAU OF THE CENSUS
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ACKNOWLEDGMENTS

This report was prepared by Ruth Sanders and Graham Spanier, under the general direction of Gordon Green and Arthur Norton. Assistance in preparation and review of the report was provided by Carol Fendler, Mary Henson, Arlene Saluter, and Arno Winard. The tables on child support and alimony were programmed by Richard Hornseth. Overall direction was provided by Roger Herriot, Assistant Division Chief (Socioeconomics Statistics Programs) and Paul Glick, Senior Demographer, of the Population Division. Sampling review was conducted by Paul Hsen and Donald Luery of the Statistical Methods Division. The publication was edited by Paula Coupe, Publications Services Division, with the assistance of Vivian Brown, Population Division.

Library of Congress Cataloging in Publication Data

United States. Bureau of the Census.
Divorce, child custody, and child support.

(Current population reports : Special studies :
Series P-23 ; no. 84)

1. Divorce—United States—Statistics.
2. Custody of children—United States—Statistics.
3. Support (Domestic relations)—United States—
Statistics. I. Title. II. Series: United States.

Bureau of the Census. Current population reports :
Special studies : Series P-23 ; no. 84.

HA203.A218 no. 84 [HQ833] 312'.0973s
[312'.5'0973] 79-607067

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by a draft on a U.S. bank. **Current Population Reports** are sold in two subscription packages: Series P-20, P-23, P-27, and P-60 are available for \$40.00 per year (\$10 additional for foreign mailing); Series P-25, P-26, and P-28 are available for \$70.00 per year (\$17.50 additional for foreign mailing). The single-copy price of this report is \$1.50.

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SYMBOLS USED IN TABLES

- Represents zero or rounds to zero.
- B Base less than 75,000 for CPS, or less
than 60 sample cases for SIE.
- ... Not applicable.
- NA Not available.

Divorce, Child Custody, and Child Support

INTRODUCTION

The rapid rise in the divorce rate during the last two decades has stimulated interest in the living arrangements and financial position of persons involved in divorce, especially that of the women and children. The extent to which women report receiving child support and alimony, based on information collected by the Bureau of the Census in the Survey of Income and Education (SIE) during the spring of 1976, is presented in this report.

The first several sections of this report are devoted to background information which place the SIE data in historical perspective. These sections deal with the increase in divorce and in one-parent families and with changes in the living arrangements of children, in particular, the children of divorce. The information in these sections was obtained from reports of the Division of Vital Statistics, National Center for Health Statistics, and from reports based on the Census Bureau's decennial censuses and the Current Population Survey (CPS).

The statistics from the CPS and from the SIE are based on samples and are, therefore, subject to sampling variability as well as other sources of error. A further discussion of the sampling variability is presented in the section, "Source and Reliability of the Estimates."

TRENDS IN DIVORCE

Before 1940, the divorce rate in the United States was relatively low, about 2 per 1,000 population. Shortly after World War II (by 1946), the rate reached 4.3, an all-time high at that time (figure 1 and table 1). From that peak, the rate fell steadily until it reached a low of 2.2 in 1960, at which time it again turned upward and started the climb which culminated in the historic high level of 5.1 per 1,000 population in 1978. Throughout 1976 and 1977, the divorce rate remained virtually unchanged with the number of divorces (1.1 million) amounting to about one-half the number of marriages (2.1 million in 1976 and 2.2 million in 1977). In 1978, there were 1.1 million divorces and 2.2 million marriages; the divorce rate was 5.1 per 1,000, and the marriage rate was 10.3 per 1,000 population. If the current level of divorce continues on a lifetime basis, the proportion of marriages ending in divorce may be close to 40 percent.¹

¹ Paul C. Glick and Arthur J. Norton, "Marrying, Divorcing, and Living Together in the U.S. Today," *Population Bulletin*, Vol. 32, No. 1 (Population Reference Bureau Inc., Washington, D.C., 1977, updated February 1979).

CHILDREN INVOLVED IN DIVORCE

The number of children involved in divorce tripled in two decades, from 361,000 in 1956 to 1,117,000 in 1976 (table 2). The average number of children per divorce rose from 0.95 in 1956 to a peak of 1.36 in 1964. During that time, the proportion of divorces involving no children declined from 51 percent to 37 percent. By 1976, the average number of children per divorce fell to 1.03, while the proportion of divorces involving no children rose from 37 percent in 1964 to 43 percent in 1976.

Despite the decrease in the number of children involved per divorce and the increase in divorces not involving children, the rising divorce rate caused the total number of children involved in divorce to climb to an all-time high of 1,123,000 in 1975. The corresponding number in 1976 remained virtually unchanged at 1,117,000. This recent stabilization has provided a basis for anticipating that the annual number of children involved in divorce may decline significantly in the years ahead.

ONE-PARENT VERSUS TWO-PARENT FAMILIES

Since 1960, there has been a far more rapid increase in the number of one-parent families than in two-parent families (table 3). In fact, the number of two-parent families declined slightly between 1970 and 1978 after having increased moderately during the 1960's. During both of these periods, the number of one-parent families maintained by a woman increased tremendously—by 55 percent during the 1960's and 78 percent during the shorter span from 1970 to 1978. By 1978, fully 19 percent of all families with sons/daughters under 18 years of age in the home were maintained by only one parent—17 percent by the mother and 2 percent by the father.

Because close to one-third (32 percent) of the 5.2 million mother-only families are maintained by Black women and Blacks only constitute one-ninth of the total U.S. population, the information about one-parent families as a whole reflects disproportionately the characteristics of Black mothers. For example, the proportion of mother-only families maintained by a never-married woman is four times as large for Black women as for White women (34 percent versus 8 percent). Moreover, the proportion of mother-only families maintained by a separated woman is larger for Black women than for White women (29 percent versus 21 percent). However, a larger proportion of White than Black

mother-only families are maintained by a divorced woman (52 percent versus 24 percent). This leads to the conclusion that White couples are more likely than Black couples to resolve an unsatisfactory marital situation by divorce.

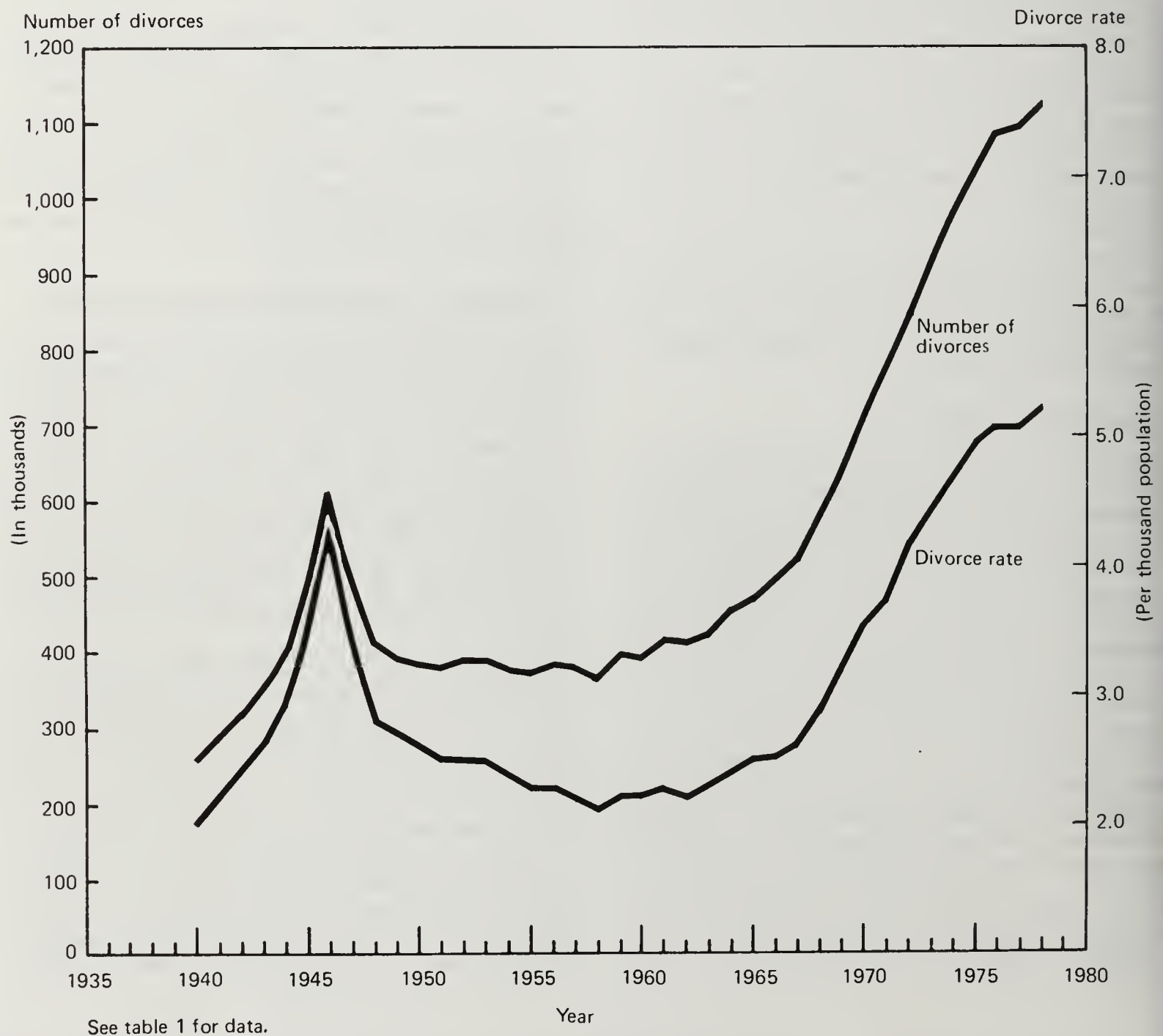
More than twice as large a proportion of families with children present were maintained by only the mother in 1978 as in 1960—17 percent in 1978 versus 7 percent in 1960. The corresponding figures for White mother-only families (13 percent and 6 percent, respectively) stood in sharp contrast with those for comparable Black families (45 percent and 21 percent, respectively). As shown in table 3, the rate of increase for White mother-only families was even more pronounced during the 8 years since 1970 than during the 10 years of the 1960's. Although Black mother-only families already constituted a far higher proportion of all Black families than White mother-only families did of all

White families in 1970, the proportion of Black mother-only families increased at a more rapid rate during the 1970-78 period than their White counterparts (83 percent versus 74 percent).

More of the mother-only families in 1978 than in 1970 were maintained by a woman under 35 years of age (51 percent versus 43 percent). A contributing factor is the movement of the large numbers of women who were born during the baby boom into the age range in which marriages and divorces most often occur.

The number of families maintained by the father only is relatively small but has been growing at about as fast a pace as mother-only families since 1970. In 1978, 1.6 percent of children under 18 years of age were living in father-only families.

FIGURE 1.
Number of Divorces and Divorce Rate:
United States, 1940 to 1978



REMARRIAGE OF DIVORCED WOMEN

Table 5 presents a profile of divorced women who had remarried and of those who had not remarried by the survey date in 1975. More than three-fourths of the women whose first marriage ended in divorce before the age of 30 were remarried. The likelihood of remarriage was more than twice as great for women who were under 30 years of age at the time of divorce as for those who were 40 or older when they divorced. Among women who remarried after their first marriage was terminated by divorce, the average time between divorce and remarriage was 3.2 years.

Young women with no children were most likely to remarry following a divorce; nearly 4 out of 5 of the women who were under 30 and who were childless when they divorced were already remarried by the survey date. However, children appear to be a minor deterrent to remarriage for young women.

LIVING ARRANGEMENTS OF CHILDREN

Nearly all of the children under 18 years of age² (96 percent) in 1978 were living with one or both of their parents. About 1.1 percent were living with a grandparent or other close relative.

Data on children living with one or both parents are featured in table 6. Primarily because of fluctuations in the birth rate during the last three decades, the number of children under 18 living with parent(s) increased between 1960 and 1970 but actually declined overall between 1960 and 1978. During the 18-year period, the proportion of children living with two parents dropped sharply from 91 percent in 1960 to 81 percent in 1978. In the same period, the proportion living with their mother only more than doubled, rising from 8.2 percent to 17.6 percent, while those living with their father only rose from 1.2 percent to 1.6 percent. Thus, 19.2 percent of all children living with parent(s) lived with one parent in 1978.

For most children in one-parent families, this living arrangement is a temporary one, spanning a period of a few years, usually until their custodial parent remarries, reconciles, or marries for the first time. Only a minority of children under 18 are likely to spend a major portion of their childhood in a one-parent family. Nevertheless, to the child living with only one parent for a few years, this period represents a psychologically and socially significant part of his or her life span.

The number of children living with one parent increased by 440,000 per year between 1970 and 1978 as compared with 240,000 per year during the 1960's. The most rapid rates of increase were for children living with a divorced or never-married mother. The proportion of children living with a divorced mother doubled between 1970 and 1978 (from 3.4 percent to 7.1 percent), and the proportion living with a never-married mother tripled (from 0.8 percent to 2.7 percent) during that period. The slower growth in the proportion living with a separated mother (from 3.5 percent to 4.8 percent) reflects a growing tendency for couples with

serious marital problems to resolve them by divorce rather than by separation.

An analysis of current data on living arrangements suggests that if current conditions persist, children born in the mid-1970's have about 45 chances in 100 of living in a one-parent family for a period of at least several months before they reach the age of 18 years.³ However, because most young women remarry, a large proportion of these children will eventually spend part of their childhood in a two-parent family with a biological parent and a stepparent. In 1977, an estimated one-tenth of the children living with two parents were living with a stepparent, that is, were born before the natural parent they live with had remarried.⁴

SELECTED CHARACTERISTICS OF WOMEN RECEIVING CHILD SUPPORT PAYMENTS IN 1975

Family Characteristics

Data on the receipt of child support from the fathers of children were obtained from the SIE for women with one or more own children present at the survey date who were either divorced, separated, remarried, or never married. About one-fourth of the 4.9 million mothers in these four categories received child support payments. Because of the design of the SIE questionnaire, data on the amount of child support received are not available for about 110,000 women who received alimony or other regular contributions from outside the household in addition to their child support payments. The data in this and later sections on amounts of child support received apply to the 1.1 million women whose only support payments came from child support. It should be noted that the data refer only to child support reported as actually received, not to payments which may have been awarded or agreed upon but were not collected.

The median family income in 1975 for mothers who received some child support was considerably higher than that for women who did not (\$12,210 compared to \$8,440). (See table 7.) For most women, however, the amount of child support received was fairly small. The mean amount was \$2,430, but that figure apparently reflects the impact of large payments received by a relatively small number of women. About two-fifths of women with child support income received less than \$1,000; about three-fifths received less than \$1,500. Interestingly, mean child support payments per family did not increase significantly as the number of children increased. As might be expected from the rather small amounts received, child support payments are generally not the primary source of income for recipients. For approximately half of the women getting child support, the payments constituted less than 10 percent of total family income. Only 5 percent obtained more than half of their family income from child support.

The poverty rate for women receiving child support payments was considerably lower than the rate for women who did not (12 percent compared to 32 percent). In many in-

² There were 63,206,000 children under 18 years of age in March 1978. See *Current Population Reports*, Series P-20, No. 338, table 4.

³ Paul C. Glick and Arthur J. Norton, *op. cit.*

⁴ Paul C. Glick, "The Future of the American Family," *Current Population Reports*, Series P-23, No. 78, January 1979.

stances, women near the poverty line who received child support would have fallen below the poverty level if those payments were eliminated. In fact, when child support income is excluded from total income, the poverty rate for mothers who received it rises from 12 percent to 19 percent. By excluding child support income and then examining poverty status, it becomes evident that child support is a major source of income for some mothers with incomes close to the poverty line. For example, women whose family incomes would have been below the poverty level without child support reported mean child support incomes of \$3,330.

Characteristics of Women

Both the likelihood that a woman with children will receive child support and the amount she receives may vary widely, depending on her characteristics. For example, 42 percent of currently divorced mothers with at least one child present in their homes received child support payments, compared to 26 percent of remarried mothers, 18 percent of separated mothers, and only 4 percent of never-married mothers (table 8). Mean amounts received ranged from \$3,180 (for separated mothers) to \$1,500 (for never-married mothers).

Black women constituted 28 percent of all women eligible for, but not necessarily awarded, child support payments. However, of all the women who actually received child support payments, only 12 percent were Black. The amount of child support paid to White women was, on the average, higher than the amount received by either Black women or women of Spanish origin. For White women, the mean amount of this type of income was approximately \$2,540, compared to \$1,600 for Black women and \$1,980 for women of Spanish origin.

Women under 30 years of age, on the average, received less in child support payments than those who were older. The mean amount received by younger women was approximately \$1,350 as compared to \$2,870 for women 30 years old and older. Although information on incomes of fathers is not available from this survey, incomes of men tend to increase as their age increases, up until retirement age. Because men and women traditionally tend to marry within similar age groups, the ex-husbands of older mothers are likely to have higher incomes than those of younger mothers. Since older women tend to have older children, it is not surprising that the mean amount of child support received also increased along with the age of the youngest child. For women whose youngest child was under 5 years old, the mean child support payment was \$1,750. For women whose youngest child was 5 to 11 or 12 to 17 years of age, the mean amounts were \$2,310 and \$3,450, respectively.

Receipt of child support is directly related to the level of educational attainment. About 45 percent of mothers with 4 or more years of college received some child support from the fathers of their children, compared to 29 percent of mothers who were only high school graduates and just 11 percent of mothers who did not complete any years of high school. Furthermore, the mean amount received by college graduates (\$5,290) was higher than that received by women with lower educational attainment, such as high school

graduates (\$1,960). Presumably, highly educated women tend to marry similarly well-educated men with relatively high incomes, who can better afford to make substantial child support payments.

The median income of women who received child support was higher than that of women who did not (\$6,860 compared to \$4,250). However, among women with child support, higher income levels were not consistently associated with higher child support payments. Mean amounts of child support received rose along with income for women whose total incomes were in the upper and lower portions of the income distribution (less than \$4,000, or \$8,000 and over). For women with incomes between \$4,000 and \$8,000, the mean amount received did not vary significantly, indicating that increases in total income came from income sources other than child support.

Interestingly, women who received child support were more likely to have earnings than women who did not, perhaps due in part to their higher educational level. About three-fourths of women getting child support payments also had some earnings, compared to 58 percent of women who received no child support. Conversely, 38 percent of women without child support from the father of their children received public assistance income, compared to only 13 percent of women with child support income.

There was no significant difference in the mean amount of child support paid to women who worked some time during the year and those who did not work at all. However, women working at part-time jobs received a considerably higher mean amount (\$3,640) than women who worked full time (\$2,210). It is possible that the women working full time do so because they are receiving lower child support payments. Among women who worked, there was some difference in mean amount of child support received for the various occupation groups. Although the mean amounts received by white-collar workers (\$2,650) and service workers (\$2,410) were not significantly different from one another, both were much greater than the mean amount received by blue-collar workers.

Living Arrangements and Poverty Status

There were 18.3 million persons living in families which included a divorced, separated, remarried, or never-married woman. The poverty rate for these persons was 27 percent, compared to 8 percent for all other persons in families. Of the 18.3 million persons, only 13 percent of those in families with child support were poor, compared to 32 percent of those in families without child support.

There was some variation in the poverty status of persons depending on the type of family they lived in. Among persons in families not receiving child support, those in primary families⁵ (by far the largest group) had a poverty rate of 32 percent. In primary families where there was

⁵ A primary family is a family which includes among its members the person maintaining the household. A married couple or one parent with children who share the living quarters of a relative maintaining the household constitutes a subfamily within the primary family. A secondary family is a family whose members are not related to the person maintaining the household.

also a subfamily present, the poverty rate was much higher (71 percent); this may be due in part to larger size families.

Persons in primary families receiving child support experienced poverty rates that were much lower. The poverty rate for persons in these families was 13 percent. The comparable rate was 47 percent for those in which a subfamily was also present.

Regions and Divisions

The mean amount of child support received by women living in the Northeast Region (\$3,210) was significantly higher than that received by women living in the South Region (\$2,130) and the North Central Region (\$2,240). Because of the high degree of sampling variability, no other differences between regions were statistically significant. Within the southern region, women in the East South Central Division (consisting of Kentucky, Tennessee, Alabama, and Mississippi) received a particularly low mean amount (\$1,510), considerably less than the figure for the region as a whole (table 9).

CHARACTERISTICS OF WOMEN RECEIVING ALIMONY PAYMENTS IN 1975

Data on alimony were tabulated from the SIE for women who were either divorced or separated before 1975. Out of the 4.5 million divorced or separated women, only 4 percent reported that they had received alimony in 1975 (table 10).

It is not known how many of these women were actually entitled to receive such benefits. The mean amount of alimony received by women was about \$4,120 in 1975⁶. However, because of the large sampling variability associated with this figure (the standard error was \$1,000), this is only a rough approximation of the average amount of alimony actually received by these women.

In general, older women were more likely to receive alimony than younger women. For example, 5 percent of women 30 years old and over who had been divorced or separated received alimony compared to only 1 percent of those under 30 years. There may be various reasons for this occurrence. Since husbands and wives tend to be within the same approximate age range, one might conclude that the lower earnings received by younger husbands may be one factor behind the low proportion of women under 30 receiving alimony.

The proportion of women receiving alimony was considerably higher for those who had children 12 to 17 years old than for those whose children were younger (8 percent vs. 3 percent). This difference may be attributable to the age of the woman (the older the children, the older she is likely to be) and the factors mentioned above. In addition, women who had some college education were more likely to receive alimony than those with lower educational attainment.

⁶ This mean is for women receiving alimony and no other support payments from outside their household.

NOTE

In the past the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

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Table 1. Number of Divorces and Divorce Rates With Percent Changes From Preceding Years: 1940 to 1978

(For meaning of symbols, see text)

Year	Number of divorces	Percent change in number	Rate per 1,000 total popu- lation	Percent change in rate	Rate per 1,000 married women, 15 years and over	Percent change in rate
1978 ¹	1,122,000	+2.9	5.1	+2.0	22.0	+3.3
1977 ¹	1,090,000	+0.6	5.0	-	21.3	+0.9
1976 ¹	1,083,000	+4.5	5.0	+2.0	21.1	+3.9
1975.....	1,036,000	+6.0	4.9	+6.5	20.3	+5.2
1974.....	977,000	+6.8	4.6	+4.5	19.3	+6.0
1973.....	915,000	+8.3	4.4	+7.3	18.2	+7.1
1972.....	845,000	+9.3	4.1	+10.8	17.0	+7.6
1971.....	773,000	+9.2	3.7	+5.7	15.8	+6.0
1970.....	708,000	+10.8	3.5	+9.4	14.9	+11.2
1969.....	639,000	+9.4	3.2	+10.3	13.4	+7.2
1968.....	584,000	+11.7	2.9	+11.5	12.5	+11.6
1967.....	523,000	+4.8	2.6	+4.0	11.2	+2.8
1966.....	499,000	+4.2	2.5	-	10.9	+2.8
1965.....	479,000	+6.4	2.5	+4.2	10.6	+6.0
1964.....	450,000	+5.1	2.4	+4.3	10.0	+4.2
1963.....	428,000	+3.6	2.3	+4.5	9.6	+2.1
1962.....	413,000	-0.2	2.2	-4.3	9.4	-2.1
1961.....	414,000	+5.3	2.3	+4.5	9.6	+4.3
1960.....	393,000	-0.5	2.2	-	9.2	-1.1
1959.....	395,000	+7.3	2.2	+4.8	9.3	+4.5
1958.....	368,000	-3.4	2.1	-4.5	8.9	-3.3
1957.....	381,000	-0.3	2.2	-4.3	9.2	-2.1
1956.....	382,000	+1.3	2.3	-	9.4	+1.1
1955.....	377,000	-0.5	2.3	-4.2	9.3	-2.1
1954.....	379,000	-2.8	2.4	-4.0	9.5	-4.0
1953.....	390,000	-0.5	2.5	-	9.9	-2.0
1952.....	392,000	+2.9	2.5	-	10.1	+2.0
1951.....	381,000	-1.1	2.5	-3.8	9.9	-3.9
1950.....	385,144	-3.0	2.6	-3.7	10.3	-2.8
1949.....	397,000	-2.7	2.7	-3.6	10.6	-5.4
1948.....	408,000	-15.5	2.8	-17.6	11.2	-17.6
1947.....	483,000	-20.8	3.4	-20.9	13.6	-24.0
1946.....	610,000	+25.8	4.3	+22.9	17.9	+24.3
1945.....	485,000	+21.3	3.5	+20.7	14.4	+20.0
1944.....	400,000	+11.4	2.9	+11.5	12.0	+9.1
1943.....	359,000	+11.8	2.6	+8.3	11.0	+8.9
1942.....	321,000	+9.6	2.4	+9.1	10.1	+7.4
1941.....	293,000	+11.0	2.2	+10.0	9.4	+6.8
1940.....	264,000	(NA)	2.0	(NA)	8.8	(NA)

¹Provisional data.

Source: U.S. National Center for Health Statistics, *Vital and Health Statistics*, Series 21, No. 29, "Divorces and Divorce Rates: United States," table 1; and *Monthly Vital Statistics Report*, Vol. 27, No. 5 Supplement, "Advance Report: Final Divorce Statistics, 1976," table 1, and Vol. 27, No. 12, "Provisional Statistics: Births, Marriages, Divorces, and Deaths for 1978," page 1; and unpublished base for rate per 1,000 married women 15 years and over.

Table 2. Children Under 18 Years Old Involved in Parents' Divorce: 1956 to 1976

(Numbers in thousands)

Year	Total divorces	No children at divorce		1 or more children at divorce		
		Number	Percent of total	Total children	Per decree	Per decree involving children
1976.....	1,083	465	42.9	1,117	1.03	1.81
1975.....	1,036	426	41.1	1,123	1.08	1.84
1974.....	977	410	42.0	1,099	1.12	1.94
1973.....	915	371	40.5	1,079	1.17	1.98
1972.....	845	337	39.9	1,021	1.20	2.01
1971.....	773	310	40.1	946	1.22	2.04
1970.....	708	284	40.1	870	1.22	2.05
1969.....	639	252	39.4	840	1.31	2.17
1968.....	584	228	39.0	784	1.34	2.20
1967.....	523	204	39.0	701	1.34	2.20
1966.....	499	198	39.7	669	1.34	2.22
1965.....	479	193	40.2	630	1.32	2.20
1964.....	450	168	37.4	613	1.36	2.25
1963.....	428	164	38.4	562	1.31	2.21
1962.....	413	164	39.8	532	1.29	2.16
1961.....	414	164	39.7	516	1.25	2.01
1960.....	393	170	43.3	463	1.18	2.08
1959.....	395	162	40.9	468	1.18	2.01
1958.....	368	165	44.9	398	1.08	1.96
1957.....	381	187	49.1	379	0.99	1.95
1956.....	382	195	51.1	361	0.95	1.93

Source: U.S. National Center for Health Statistics, Vital Statistics of the United States, Vol. III, Marriage and Divorce, annual reports; and Monthly Vital Statistics Reports, Vol. 27, No. 5 Supplement, "Advance Report: Final Divorce Statistics, 1976," tables 2, 4, and 5.

Table 3. Two-Parent and One-Parent Families by Race: 1978, 1970, and 1960

Numbers in thousands. For meaning of symbols, see text)

Type of family	1978	1970	1960	Percent change	
				1970 to 1978	1960 to 1970
All families with own children under 18.....	30,369	28,665	25,691	5.9	11.6
Percent.....	100.0	100.0	100.0	...	...
Two-parent families.....	81.1	88.6	91.5	-3.1	8.1
One-parent families.....	18.9	11.4	8.5	76.2	48.7
Maintained by a:					
Woman.....	17.1	10.2	7.4	78.0	54.6
Man.....	1.8	1.2	1.1	60.9	11.3
White families with own children under 18.....	26,168	25,439	23,294	2.9	9.2
Percent.....	100.0	100.0	100.0	...	...
Two-parent families.....	85.0	91.1	93.0	-4.0	7.0
One-parent families.....	15.0	8.9	7.0	72.6	38.3
Maintained by a:					
Woman.....	13.3	7.9	6.0	73.6	43.9
Man.....	1.7	1.0	1.0	65.3	6.5
Black families with own children under 18.....	3,641	2,933	¹ 2,191	24.1	33.9
Percent.....	100.0	100.0	100.0	...	...
Two-parent families.....	52.2	67.0	77.0	-3.2	16.4
One-parent families.....	47.8	33.0	23.0	79.6	92.3
Maintained by a:					
Woman.....	45.0	30.6	20.7	82.7	97.8
Man.....	2.7	2.4	2.3	39.4	42.0

¹The number of Black families in 1960 was distributed on the basis of data for persons of races other than White.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-20, No. 218, "Household and Family Characteristics: March 1970," table 1; 1960 Census of Population, Vol. I, United States Summary, table 186, and Vol. II, 4A, Families, table 5; and unpublished Current Population Survey data.

Table 4. Characteristics of One-Parent Families Maintained by a Woman: 1978, 1975, and 1970

(Numbers in thousands)

Characteristic	1978			1975			1970		
	Total	White	Black	Total	White	Black	Total	White	Black
All mother-child families ¹ ...	5,206	3,485	1,641	4,405	2,973	1,382	2,926	1,995	912
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Marital status of mother:									
Never married.....	16.1	7.9	33.7	11.7	5.8	24.7	8.0	3.3	18.2
Separated.....	23.6	21.2	29.2	27.1	22.8	36.4	26.3	19.2	41.9
Divorced.....	42.8	51.8	23.5	38.2	46.1	20.9	32.7	40.1	16.6
Widowed.....	12.7	13.9	9.9	17.8	19.9	13.7	22.0	25.1	15.5
Married spouse absent, except separated.....	4.8	5.2	3.7	5.2	5.5	4.3	11.0	12.3	7.9
Age of mother:									
Under 35 years.....	50.9	47.9	57.2	50.2	47.8	56.2	43.1	39.8	50.0
35 to 44 years.....	31.2	32.5	28.8	29.5	30.0	28.0	31.4	31.4	31.6
45 to 64 years.....	17.6	19.4	13.7	19.9	21.9	15.3	25.2	28.4	18.2
65 years and over.....	0.3	0.3	0.2	0.4	0.3	0.5	0.3	0.4	0.2
Number and age of children:									
Average number of children under 18.....	1.93	1.80	2.21	2.10	1.94	2.43	2.29	2.06	2.77
Average number of children under 6.....	1.28	1.20	1.41	1.31	1.27	1.41	1.43	1.37	1.52

¹Families maintained by a woman with no husband present but with one or more of her own children under 18 years of age present.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-20, No. 291, "Household and Family Characteristics: March 1975," tables 1 and 13, and unpublished Current Population Survey data.

Table 5. Characteristics of Divorced Women: 1975

(Numbers in thousands. Women whose first marriage ended in divorce, by age at divorce, number of children born before divorce, duration of divorce, and whether remarried)

Age at divorce and number of children born before divorce	All women whose first marriage ended in divorce		Percent remarried by survey date	Median years divorced ¹		
	Number	Percent		Total	At survey date	
					Divorced	Remarried
Total, aged 14 to 75 with fewer than 6 children born before divorce.....	9,068	100.0	66.0	3.8	4.7	3.2
Aged 14 to 29 at divorce.....	5,845	64.5	76.3	3.1	3.4	3.1
No children.....	1,932	21.3	79.6	2.9	2.6	2.9
1 child.....	1,947	21.5	75.0	3.1	3.6	3.0
2 children.....	1,233	13.6	74.9	3.1	3.4	3.0
3 to 5 children.....	732	8.1	73.6	4.0	5.2	3.8
Aged 30 to 39 at divorce.....	2,202	24.3	56.2	4.5	5.8	3.8
Aged 40 to 75 at divorce.....	1,021	11.3	28.1	5.5	6.5	2.9

¹Number of years between divorce and survey date for those still divorced; number of years between divorce and second marriage for those remarried.

Source: U.S. Bureau of the Census, Current Population Reports, Series P-20, No. 312, "Marriage, Divorce, Widowhood, and Remarriage by Family Characteristics: June 1975," tables I, J, and K.

Table 6. Children Under 18 Years Old Living With Two Parents or With One Parent, by Sex of Parent and Marital Status : 1978, 1970, and 1960

(Numbers in thousands. For meaning of symbols, see text)

Sex of parent and marital status	1978	1970	1960	Percent change	
				1970 to 1978	1960 to 1970
All children under 18 living with one or both parents.....	60,842	67,138	62,119	-9.4	8.1
Percent.....	100.0	100.0	100.0	...	...
Living with two parents.....	80.8	87.8	90.6	-16.6	4.7
Living with one parent.....	19.2	12.2	9.4	42.8	40.6
Living with mother only.....	17.6	11.1	8.2	43.9	45.9
Never married.....	2.7	0.8	0.4	209.9	138.5
Separated.....	4.8	3.5	2.4	26.2	55.5
Divorced.....	7.1	3.4	1.9	88.8	89.8
Widowed.....	2.1	2.1	2.1	-10.4	6.4
Married, husband absent, except separated.....	0.9	1.3	1.4	-37.3	4.4
Living with father only.....	1.6	1.1	1.2	31.9	2.9
Divorced.....	0.7	0.3	0.2	135.6	37.2
Other.....	0.9	0.9	1.0	-0.5	-4.4

Source: U.S. Bureau of the Census, 1960 Census of Population, Vol. I, U.S. Summary, table 185; and unpublished Current Population Survey data.

Table 7. Currently Divorced, Separated, Remarried, and Never-Married Women, by Total Money Income, Poverty Status, and Amount of Child Support Payments Received in 1975: SIE

(NUMBERS IN THOUSANDS. WOMEN AS OF SPRING 1976. WOMEN DIVORCED OR SEPARATED BEFORE 1975 WITH OWN CHILDREN UNDER 18 YEARS OLD LIVING WITH THEM AT THE TIME OF DIVORCE OR SEPARATION AND AT THE SURVEY DATE. FOR MEANING OF SYMBOLS, SEE TEXT)

TOTAL MONEY INCOME AND POVERTY STATUS	TOTAL	OIO NOT RECEIVE CHILDO SUPPORT IN 1975	RECEIVED SUPPRT PAYMENTS IN 1975 ¹												
			TOTAL	TOTAL	RECEIVED CHILD SUPPRT BUT ND OTHER SUPPRT PAYMENTS										
						AMOUNT DF CHILD SUPPRT PAYMENTS RECEIVED									
						\$1 TO \$999	\$1,000 TO \$1,499	\$1,500 TO \$1,999	\$2,000 TO \$2,999	\$3,000 TO \$3,999	\$4,000 TO \$4,999	\$5,000 TO \$6,999	\$7,000 AND OVER	MEAN AMOUNT	
													VALUE (DOLLS.)	STANDARO ERROR (DOLLS.)	
TOTAL FAMILY INCOME															
TOTAL	4 922	3 676	1 246	1 137	445	232	160	170	67	32	19	11	2 432	107	
STANDARO ERROR	80	69	40	39	24	17	15	15	9	7	5	4	...	...
UNDER \$2,000	249	225	24	20	15	4	1	-	-	-	-	-	(8)	(8)	
\$2,000 TO \$3,999	680	607	73	69	39	14	7	6	3	-	-	-	1 462	108	
\$4,000 TO \$5,999	606	500	105	93	40	20	10	11	6	5	1	-	2 202	115	
\$6,000 TO \$7,999	558	428	129	115	51	25	15	16	4	3	-	1	1 987	124	
\$8,000 TO \$9,999	479	341	138	124	41	36	21	14	6	2	3	2	2 408	185	
\$10,000 TO \$11,999	414	274	139	125	52	21	16	20	8	3	2	4	2 413	199	
\$12,000 TO \$14,999	506	345	160	146	58	26	25	22	8	5	2	1	2 204	164	
\$15,000 TO \$24,999	952	654	298	278	103	65	43	37	10	7	10	3	2 370	188	
\$25,000 AND OVER	481	301	180	167	46	22	22	45	21	7	2	1	3 777	585	
MEDIAN INCOME DOLLARS . .	9 529	8 443	12 208	12 359	11 364	11 581	12 868	14 490	14 385	13 629	(8)	(8)	...	...
STANDARO ERROR DOLLARS . .	133	152	216	235	383	719	632	891	1 603	1 131	(8)	(8)	...	...
MEAN INCOME DOLLARS . .	12 157	11 205	14 966	15 079	13 095	13 801	15 103	18 658	19 572	17 588	(8)	(8)	...	...
STANDARO ERROR DOLLARS . .	132	148	278	290	367	518	672	877	1 541	1 806	(8)	(8)	...	...
PER CAPITA INCOME DOLLARS . .	2 971	2 697	3 835	3 830	3 363	3 887	3 840	4 455	4 440	3 863	(8)	(8)	...	...
STANDARO ERROR DOLLARS . .	38	41	81	83	116	166	228	211	379	416	(8)	(8)	...	...
CHILDO SUPPRT AS A PERCENT OF FAMILY INCOME															
LESS THAN 10 PERCENT . . . . .	...	...	...	587	361	113	54	44	14	-	1	-	1 061	33
10 TO 19 PERCENT . . . . .	...	...	...	297	55	83	71	61	16	10	1	-	2 046	52
20 TO 29 PERCENT . . . . .	...	...	...	109	17	20	16	35	14	4	3	-	3 715	541
30 TO 39 PERCENT . . . . .	...	...	...	58	5	7	8	14	7	7	7	3	3 936	251
40 TO 49 PERCENT . . . . .	...	...	...	29	4	3	5	6	5	4	1	1	6 758	494
50 TO 74 PERCENT . . . . .	...	...	...	33	1	5	4	8	7	3	4	1	9 964	1 206
75 PERCENT AND OVER . . . . .	...	...	...	24	2	1	2	2	5	5	1	6	(8)	(8)
MEDIAN PERCENT . . . . .	...	...	...	9.7	4.9	10.3	13.6	15.8	23.8	32.7	(8)	(8)	...	...
STANDARO ERROR . . . . .	...	...	...	0.3	0.3	0.8	1.0	1.5	3.7	4.3	(8)	(8)	...	...
BELOW SPECIFIED POVERTY LEVEL-- INCLUDES CHILDO SUPPRT															
NUMBER															
BELOW 75 PERCENT	827	744	83	77	46	13	8	4	6	-	-	-	1 428	119	
STANDARO ERROR	43	40	13	13	10	5	4	3	4	-	-	-	...	...
BELOW 100 PERCENT	1 343	1 186	156	141	75	29	14	12	9	2	-	-	1 594	89	
STANDARO ERROR	54	51	19	18	13	8	6	5	4	2	-	-	...	...
BELOW 125 PERCENT	1 706	1 485	221	202	107	40	20	17	9	7	1	-	1 725	82	
STANDARO ERROR	61	57	22	21	15	9	7	6	4	4	1	-	...	...
POVERTY RATE															
BELOW 75 PERCENT	16.8	20.2	6.6	6.8	10.4	5.4	5.2	2.6	8.7	-	(8)	(8)	...	...
STANDARO ERROR	0.8	1.0	1.0	1.1	2.1	2.2	2.6	1.8	5.1	-	(8)	(8)	...	...
BELOW 100 PERCENT	27.3	32.3	12.5	12.4	16.8	12.3	9.0	7.0	13.5	6.5	(8)	(8)	...	...
STANDARO ERROR	0.9	1.1	1.4	1.4	2.6	3.2	3.4	2.9	6.2	6.5	(8)	(8)	...	...
BELOW 125 PERCENT	34.7	40.4	17.7	17.7	24.0	17.2	12.5	10.2	13.5	23.2	(8)	(8)	...	...
STANDARO ERROR	1.0	1.2	1.6	1.7	3.0	3.7	3.9	3.4	6.2	11.0	(8)	(8)	...	...
BELOW SPECIFIED POVERTY LEVEL-- EXCLUDES CHILDO SUPPRT															
NUMBER															
BELOW 75 PERCENT . . . . .	...	...	...	150	59	26	16	19	12	7	3	7	3 818	296
STANDARO ERROR . . . . .	...	...	...	18	11	8	6	6	5	4	3	4	...	...
BELOW 100 PERCENT . . . . .	...	...	...	214	91	40	22	24	16	9	5	7	3 332	225
STANDARO ERROR . . . . .	...	...	...	22	14	9	7	7	6	4	3	4	...	...
BELOW 125 PERCENT . . . . .	...	...	...	276	114	53	26	37	20	12	7	7	3 214	193
STANDARO ERROR . . . . .	...	...	...	25	16	11	8	9	7	5	4	4	...	...
POVERTY RATE															
BELOW 75 PERCENT . . . . .	...	...	...	13.2	13.2	11.2	10.3	11.1	18.2	23.2	(8)	(8)	...	...
STANDARO ERROR . . . . .	...	...	...	1.5	2.4	3.1	3.6	3.6	7.0	11.0	(8)	(8)	...	...
BELOW 100 PERCENT . . . . .	...	...	...	18.9	20.5	17.3	13.7	14.3	24.3	26.7	(8)	(8)	...	...
STANDARO ERROR . . . . .	...	...	...	1.7	2.8	3.7	4.0	4.0	7.8	11.6	(8)	(8)	...	...
BELOW 125 PERCENT . . . . .	...	...	...	24.2	25.7	22.6	16.5	21.9	30.0	36.9	(8)	(8)	...	...
STANDARO ERROR . . . . .	...	...	...	1.9	3.1	4.1	4.4	4.7	8.3	12.6	(8)	(8)	...	...

¹SUPPORT PAYMENTS INCLUDE CHILDO SUPPORT, ALIMONY, REGULAR CONTRIBUTIONS FROM PERSONS NOT LIVING IN THE HOUSEHOLD, AND OTHER SOURCES OF INCOME NOT SPECIFICALLY ENUMERATED IN THE SIE.

Table 8. Selected Characteristics of Currently Divorced, Separated, Remarried, and Never-Married Women, by Amount of Child Support Payments Received in 1975: SIE

(NUMBERS IN THOUSANDS. WOMEN AS OF SPRING 1976. WOMEN DIVORCED OR SEPARATED BEFORE 1975 WHO HAD ONE OR MORE OWN CHILDREN UNDER 18 YEARS OLD LIVING WITH THEM AT THE TIME OF DIVORCE OR SEPARATION AND AT THE SURVEY DATE. FOR MEANING OF SYMBOLS, SEE TEXT)

SELECTED CHARACTERISTICS	RECEIVED SUPPORT PAYMENTS IN 1975 ¹													
	TOTAL	010 NOT RECEIVE CHILD SUPPORT IN 1975	RECEIVED CHILD SUPPORT BUT NO OTHER SUPPORT PAYMENTS											STANDARD ERROR (DOLS.)
			TOTAL	TOTAL	AMOUNT OF CHILD SUPPORT PAYMENTS RECEIVED									MEAN AMOUNT VALUE (DOLS.)
					\$1 TO \$999	\$1,000 TO \$1,499	\$1,500 TO \$1,999	\$2,000 TO \$2,999	\$3,000 TO \$3,999	\$4,000 TO \$4,999	\$5,000 TO \$6,999	\$7,000 AND OVER		
TOTAL	4 922	3 676	1 246	1 137	445	232	160	170	67	32	19	11	2 433	107
STANDARD ERROR	80	69	40	39	24	17	15	15	9	7	5	4	...	...
MARITAL STATUS OF WOMAN														
CURRENTLY DIVORCED	1 333	773	561	487	176	104	64	77	35	15	12	4	2 836	187
CURRENTLY SEPARATED	689	564	125	110	49	16	13	16	4	5	1	6	3 178	272
REMARIED WOMEN WHOSE PREVIOUS MARRIAGE ENDED IN DIVORCE	2 001	1 477	524	504	197	103	83	75	27	11	6	2	1 947	144
NEVER-MARRIED	899	863	37	36	23	10	-	3	-	1	-	-	1 503	145
RACE AND SPANISH ORIGIN OF WOMAN														
WHITE	3 488	2 400	1 088	990	357	207	144	161	60	31	18	11	2 536	120
BLACK	1 372	1 225	147	140	85	24	16	9	4	1	1	-	1 601	133
SPANISH ORIGIN ²	363	303	60	57	28	12	6	6	3	1	-	-	1 977	254
AGE OF WOMAN														
14 TO 24 YEARS	732	652	80	76	48	15	7	2	2	1	-	2	1 388	163
25 TO 29 YEARS	966	707	259	254	123	63	35	30	1	2	-	-	1 338	65
30 TO 34 YEARS	1 064	723	341	312	106	66	52	46	20	16	5	3	2 393	136
35 TO 39 YEARS	884	607	277	252	83	37	38	48	26	5	10	5	2 698	205
40 TO 44 YEARS	631	467	164	138	47	28	16	29	6	7	3	2	3 897	622
45 YEARS AND OVER	646	520	125	105	39	24	13	15	12	2	1	-	3 381	377
YEAR OF DIVORCE OR SEPARATION														
1974	567	301	265	228	68	53	32	40	15	7	6	7	2 779	186
1973	472	289	183	161	57	24	31	29	9	10	-	2	2 846	299
1972	407	240	166	156	46	36	27	20	13	5	8	1	2 506	202
1971	344	223	121	112	40	26	18	16	7	2	2	-	2 719	525
1970	354	244	110	106	35	26	19	16	6	3	1	1	1 947	175
1965 TO 1969	1 017	747	270	251	123	44	27	36	14	4	2	-	2 065	222
1960 TO 1964	474	398	76	72	42	11	6	9	2	-	1	-	1 595	159
1955 TO 1959	223	208	15	14	9	3	-	2	-	-	-	-	(B)	(B)
BEFORE 1955	166	163	4	2	1	-	-	1	-	-	-	-	(B)	(B)
NUMBER OF OWN CHILDREN														
1 OWN CHILD	1 988	1 529	459	415	191	119	53	32	10	6	1	3	2 258	194
2 OWN CHILDREN	1 469	1 061	408	369	133	63	58	74	24	8	8	2	2 469	198
3 OR MORE OWN CHILDREN	1 466	1 086	380	352	121	50	50	64	33	18	11	7	2 600	157
MEAN NUMBER OF OWN CHILDREN	2.05	2.04	2.08	2.10	1.97	1.78	2.21	2.29	2.58	2.89	(B)	(B)	...	...
AGE OF YOUNGEST OWN CHILD														
UNDER 5 YEARS	1 631	1 306	325	309	143	73	44	30	8	8	2	1	1 751	111
5 TO 11 YEARS	2 081	1 490	592	554	201	98	76	95	44	17	15	9	2 310	129
12 TO 17 YEARS	1 210	881	329	274	102	62	39	46	15	8	2	1	3 448	327
TYPE OF RESIDENCE														
INSIDE METROPOLITAN AREAS	3 666	2 746	921	829	313	165	114	128	54	28	16	11	2 701	143
IN CENTRAL CITIES	1 943	1 550	393	363	149	82	45	50	20	8	7	2	2 459	232
OUTSIDE CENTRAL CITIES	1 723	1 196	528	466	164	83	69	78	34	20	9	8	2 890	177
OUTSIDE METROPOLITAN AREAS	1 256	930	325	308	132	67	46	42	13	4	3	1	1 709	82
TENURE														
OWNER OCCUPIED	2 245	1 574	670	603	218	118	85	101	41	19	16	3	2 699	164
RENTER OCCUPIED	2 596	2 041	555	515	216	111	72	68	24	11	4	8	2 141	137
OCCUPIER PAID NO CASH RENT	82	61	20	19	10	3	3	1	1	2	-	-	(B)	(B)
EDUCATIONAL ATTAINMENT OF WOMAN														
ELEMENTARY: LESS THAN 9 YEARS	597	531	66	63	34	12	8	5	3	-	-	-	1 546	148
HIGH SCHOOL: 1 TO 3 YEARS	1 315	1 102	213	197	97	35	32	20	8	2	1	2	1 697	106
4 YEARS	2 044	1 447	597	559	221	117	72	99	27	14	6	2	1 962	76
COLLEGE: 1 TO 3 YEARS	702	450	252	215	62	50	36	30	14	10	8	5	3 228	285
4 YEARS OR MORE	265	146	118	103	30	18	12	16	14	7	4	1	5 288	825
TYPE OF INCOME IN 1975 OF WOMAN														
WITH EARNINGS	3 100	2 138	963	875	322	183	126	140	53	27	17	8	2 431	122
WITH OTHER INCOME ³	3 288	2 043	1 245	1 136	444	232	160	170	67	32	19	11	2 434	107
WITH GOV'T TRANSFER PAYMENTS ³	2 040	1 746	294	275	140	52	27	37	11	5	1	2	1 694	95
PUBLIC ASSISTANCE INCOME	1 562	1 404	158	149	92	28	14	11	1	2	-	-	1 315	72
AID TO FAM. WITH DEP. CHILD	1 490	1 343	147	139	90	25	12	8	1	2	-	-	1 282	76
OTHER GOV'T TRANSFER PAYMENTS	628	473	155	145	62	28	13	27	9	3	1	2	1 983	161
WITH GOV'T TRANSFER PAYMENTS ONLY	924	924	-	-	-	-	-	-	-	-	-	-	(B)	(B)
WITH OTHER UNEARNED INCOME	1 668	421	1 246	1 137	445	232	160	170	67	32	19	11	2 433	107

¹SUPPORT PAYMENTS INCLUDE CHILD SUPPORT, ALIMONY, REGULAR CONTRIBUTIONS FROM PERSONS NOT LIVING IN THE HOUSEHOLD, AND OTHER SOURCES OF INCOME NOT SPECIFICALLY ENUMERATED IN THE SIE.

²PERSONS OF SPANISH ORIGIN MAY BE OF ANY RACE.

³DETAIL DOES NOT ADD TO TOTAL BECAUSE SOME WOMEN HAVE MORE THAN ONE OF THE TYPES OF INCOME SPECIFIED.

NOTE: GOVERNMENT TRANSFER PAYMENTS INCLUDE SOCIAL SECURITY OR RAILROAD RETIREMENT, SUPPLEMENTAL SECURITY INCOME, PUBLIC ASSISTANCE OR WELFARE PAYMENTS, VETERANS' PAYMENTS, AND UNEMPLOYMENT AND WORKMEN'S COMPENSATIONS.

Table 8. Selected Characteristics of Currently Divorced, Separated, Remarried, and Never-Married Women, by Amount of Child Support Payments Received in 1975: SIE—Continued

(NUMBERS IN THOUSANDS. WOMEN AS OF SPRING 1976. WOMEN DIVORCED OR SEPARATED BEFORE 1975 WHO HAD ONE OR MORE OWN CHILDREN UNDER 18 YEARS OLD LIVING WITH THEM AT THE TIME OF DIVORCE OR SEPARATION AND AT THE SURVEY DATE. FOR MEANING OF SYMBOLS, SEE TEXT)

SELECTED CHARACTERISTICS	TOTAL	DID NOT RECEIVE CHILD SUPPORT IN 1975	RECEIVED SUPPORT PAYMENTS IN 1975 ¹												MEAN AMOUNT VALUE (DOLLARS)	STANDARD ERROR (DOLLARS)
			RECEIVED CHILD SUPPORT BUT NO OTHER SUPPORT PAYMENTS													
			TOTAL	TOTAL	AMOUNT OF CHILD SUPPORT PAYMENTS RECEIVED											
					\$1 TO \$999	\$1,000 TO \$1,499	\$1,500 TO \$1,999	\$2,000 TO \$2,999	\$3,000 TO \$3,999	\$4,000 TO \$4,999	\$5,000 TO \$6,999	\$7,000 AND OVER				
INCOME IN 1975 OF WOMAN																
WITHOUT INCOME	514	514	-	-	-	-	-	-	-	-	-	-	-	(8)	(8)	
WITH INCOME	4 408	3 162	1 246	1 137	445	232	160	170	67	32	19	11	2 433	107		
\$1 TO \$999 OR LOSS	322	247	75	71	71	-	-	-	-	-	-	-	650	45		
\$1,000 TO \$1,999	447	349	97	95	33	37	26	-	-	-	-	-	1 201	47		
\$2,000 TO \$2,999	539	444	95	93	40	19	10	24	-	-	-	-	1 452	84		
\$3,000 TO \$3,999	524	450	74	65	26	11	11	6	10	-	-	-	2 059	102		
\$4,000 TO \$4,999	468	368	100	94	39	21	9	11	8	6	-	-	1 901	120		
\$5,000 TO \$5,999	393	293	101	91	37	23	8	13	4	3	3	-	2 168	143		
\$6,000 TO \$6,999	320	225	95	86	40	18	14	8	3	1	2	-	2 008	159		
\$7,000 TO \$7,999	308	211	97	87	29	23	12	16	4	2	-	1	1 919	126		
\$8,000 TO \$9,999	447	264	184	167	47	40	32	30	9	2	5	2	2 486	151		
\$10,000 TO \$14,999	506	249	257	230	69	37	33	49	18	14	5	6	2 809	157		
\$15,000 TO \$24,999	114	50	64	52	13	5	4	12	8	4	4	2	6 150	748		
\$25,000 AND OVER	21	12	9	5	1	-	-	1	2	-	1	1	(8)	(8)		
MEAN INCOMEDOLLARS	4 797	4 246	6 857	6 688	5 362	6 350	7 172	8 435	8 588	10 737	(8)	(8)	...	...
STANDARD ERRORDOLLARS	82	88	213	227	326	482	567	482	971	1 745	(8)	(8)	...	...
MEAN INCOMEDOLLARS	5 747	5 093	7 407	7 183	5 866	6 527	7 204	8 611	10 015	10 204	(8)	(8)	...	...
STANDARD ERRORDOLLARS	82	86	183	186	241	297	395	401	950	942	(8)	(8)	...	...
WORK EXPERIENCE IN 1975 OF WOMAN																
WORKED	3 126	2 157	970	881	324	184	127	142	53	27	17	8	2 427	121		
WORKED AT FULL-TIME JOBS	2 499	1 693	806	745	271	162	112	119	40	24	11	5	2 206	118		
40 WEEKS OR MORE	1 810	1 188	623	579	213	119	88	97	31	19	7	4	2 184	143		
50 TO 52 WEEKS	1 547	1 007	540	501	182	106	75	82	29	19	6	3	2 205	159		
39 WEEKS OR LESS	689	506	183	166	58	42	24	22	9	5	4	2	2 282	185		
WORKED AT PART-TIME JOBS	627	464	163	136	53	22	15	23	12	3	6	2	3 637	424		
40 WEEKS OR MORE	281	205	76	64	21	12	8	13	6	1	3	1	4 176	858		
50 TO 52 WEEKS	200	146	54	45	13	9	7	10	3	1	3	-	3 448	463		
39 WEEKS OR LESS	345	258	87	72	32	11	7	10	6	2	3	2	3 157	227		
PART-TIME WORKERS	1 379	1 004	375	335	130	69	45	51	21	7	8	5	2 622	201		
MAIN REASON FOR PART-TIME WORK:																
LOOKING FOR WORK	387	285	102	88	30	20	12	18	5	1	2	-	2 478	267		
ILL OR DISABLED	183	134	49	45	21	10	7	5	2	-	-	-	1 639	230		
GOING TO SCHOOL	96	78	18	14	9	2	-	2	-	-	-	-	(8)	(8)		
KEEPING HOUSE	638	457	181	167	58	34	23	23	13	6	6	4	2 448	186		
ALL OTHER REASONS	74	50	24	21	12	2	3	3	-	-	-	1	(8)	(8)		
DID NOT WORK	1 796	1 520	277	255	121	48	33	28	14	5	2	4	2 452	232		
MAIN REASON FOR NOT WORKING:																
ILL OR DISABLED	201	176	25	23	9	8	3	2	-	-	-	-	(8)	(8)		
GOING TO SCHOOL	103	90	13	8	3	3	1	2	-	-	-	-	(8)	(8)		
KEEPING HOUSE	1 262	1 064	198	184	89	28	25	23	8	5	1	4	2 436	301		
ALL OTHER REASONS	231	189	41	40	20	9	5	1	5	-	1	-	1 609	310		
OCCUPATION GROUP OF LONGEST JOB OF WOMAN																
TOTAL ⁴	3 126	2 157	970	881	324	184	127	142	53	27	17	8	2 427	121		
WHITE-COLLAR WORKERS	1 694	1 042	652	589	191	122	91	109	35	22	15	6	2 650	172		
PROFESSIONAL & MANAGERIAL WORKERS	523	305	218	199	65	33	26	36	15	11	9	3	3 361	443		
CLERICAL AND SALES WORKERS	1 170	736	434	390	125	89	64	73	19	11	6	3	2 287	122		
BLUE-COLLAR WORKERS	592	449	143	137	64	29	19	15	7	2	1	-	1 570	105		
SERVICE WORKERS	808	640	168	149	64	33	17	18	11	3	1	1	2 405	184		
LIVING ARRANGEMENTS AND ROVERTY STATUS																
IN PRIMARY FAMILIES:																
TOTAL PERSONS	17 296	12 782	4 513	4 151	1 538	765	616	664	289	146	91	42	...	...
BELOW POVERTY LEVEL	4 659	4 083	576	516	256	85	67	52	43	13	-	-	...	...
TOTAL OWN CHILDREN	9 532	7 007	2 525	2 316	840	399	352	375	172	93	58	27	...	...
BELOW ROVERTY LEVEL	3 001	2 618	383	339	165	52	50	33	29	10	-	-	...	...
NOT IN SUBFAMILIES:																
TOTAL PERSONS	17 082	12 612	4 470	4 109	1 524	761	606	660	279	146	91	42	...	...
BELOW ROVERTY LEVEL	4 519	3 963	556	496	247	84	64	52	36	13	-	-	...	...
TOTAL OWN CHILDREN	9 414	6 915	2 499	2 291	833	397	346	374	164	93	58	27	...	...
BELOW POVERTY LEVEL	2 922	2 552	370	326	161	51	47	33	23	10	-	-	...	...
IN SUBFAMILIES:																
TOTAL PERSONS	214	170	43	42	15	3	10	4	10	-	-	-	...	...
BELOW ROVERTY LEVEL	141	120	20	20	8	1	3	-	7	-	-	-	...	...
TOTAL OWN CHILDREN	118	92	26	25	7	2	6	2	8	-	-	-	...	...
BELOW ROVERTY LEVEL	79	66	13	13	4	1	3	-	5	-	-	-	...	...
IN SECONDARY FAMILIES:																
TOTAL PERSONS	990	865	124	119	69	25	2	21	-	-	-	1	...	...
BELOW ROVERTY LEVEL	255	242	13	12	6	6	-	-	-	-	-	-	...	...
TOTAL OWN CHILDREN	576	506	70	67	37	15	1	13	-	-	-	-	...	...
BELOW ROVERTY LEVEL	154	147	7	7	3	4	-	-	-	-	-	-	...	...

¹ SUPPORT PAYMENTS INCLUDE CHILD SUPPORT, ALIMONY, REGULAR CONTRIBUTIONS FROM PERSONS NOT LIVING IN THE HOUSEHOLD, AND OTHER SOURCES OF INCOME NOT SPECIFICALLY ENUMERATED IN THE SIE.

⁴ INCLUDES FARM WORKERS, NOT SHOWN SEPARATELY.

Table 9. Currently Divorced, Separated, Remarried, and Never-Married Women, by Amount of Child Support Payments Received in 1975, for Regions and Divisions: SIE

(Numbers in thousands. Women as of Spring 1976. Women divorced or separated before 1975 who had one or more own children under 18 years old living with them at the time of divorce or separation and at the survey date. For meaning of symbols, see text)

Regions and divisions	Total		Did not receive child support in 1975	Received support payments in 1975 ¹											
	Number	Standard error		Total	Total	Received child support but no other support payments									
						Amount of child support payments received									
						\$1 to \$999	\$1,000 to \$1,499	\$1,500 to \$1,999	\$2,000 to \$2,999	\$3,000 to \$3,999	\$4,000 to \$4,999	\$5,000 to \$6,999	\$7,000 and over	Mean amount Value (dols.)	Standard error (dols.)
United States.....	4,922	80	3,676	1,246	1,137	445	232	160	170	67	32	19	11	2,433	107
Northeast.....	1,004	37	788	216	186	63	41	18	37	12	8	2	5	3,206	376
New England.....	224	11	173	51	45	15	10	4	9	3	2	1	1	2,696	250
Middle Atlantic.....	780	36	615	164	141	48	31	14	28	9	6	1	4	3,367	524
North Central.....	1,204	33	874	330	304	106	70	44	52	20	5	8	-	2,243	135
East North Central.....	904	30	649	255	236	79	52	35	43	17	4	7	-	2,273	167
West North Central.....	300	14	225	75	68	27	18	9	9	3	1	1	-	2,139	208
South.....	1,714	48	1,313	400	378	168	79	58	38	22	7	3	2	2,126	186
South Atlantic.....	853	35	646	207	189	74	47	35	18	11	1	3	-	2,318	233
East South Central.....	357	20	273	84	80	42	14	10	8	3	2	-	1	1,509	159
West South Central.....	505	26	395	110	109	52	18	13	12	8	5	-	1	2,248	493
West.....	1,000	41	700	300	268	108	43	40	43	12	12	7	4	2,543	228
Mountain.....	232	9	165	67	61	27	12	8	8	3	2	1	1	2,535	375
Pacific.....	768	40	535	233	207	81	31	32	35	10	10	6	3	2,545	200

¹Support payments include child support, alimony, regular contributions from persons not living in the household, and other sources of income not specifically enumerated in the SIE.

Table 10. Selected Characteristics of Currently Divorced and Separated Women by Receipt of Alimony Payments in 1975: SIE

(Numbers in thousands. Women as of Spring 1976. Divorced or separated before 1975. For meaning of symbols, see text)

Selected characteristics of women	Total	Did not receive alimony payments	Received alimony payments	
			Number	Percent of total
Total.....	4,522	4,342	180	4.0
Standard error.....	76	75	15	...
MARITAL STATUS				
Currently divorced.....	3,200	3,054	146	4.6
Currently separated.....	1,322	1,288	34	2.6
RACE AND SPANISH ORIGIN				
White.....	3,303	3,139	164	5.0
Black.....	1,150	1,138	12	1.0
Spanish origin ¹	307	303	4	1.3
AGE				
14 to 24 years.....	255	252	4	1.6
25 to 29 years.....	607	601	5	0.8
30 to 34 years.....	588	564	24	4.1
35 to 39 years.....	522	498	23	4.4
40 to 44 years.....	489	461	28	5.7
45 years and over.....	2,062	1,966	96	4.7
AGE OF YOUNGEST OWN CHILD				
Under 5 years.....	525	513	12	2.3
5 to 11 years.....	1,039	1,006	33	3.2
12 to 17 years.....	663	607	56	8.4
EDUCATIONAL ATTAINMENT				
Elementary: Less than 9 years....	877	863	14	1.6
High school: 1 to 3 years.....	983	961	22	2.2
4 years.....	1,581	1,515	66	4.2
College: 1 to 3 years.....	676	634	42	6.2
4 years or more.....	405	370	35	8.6

¹Persons of Spanish origin may be of any race.

Appendix

DEFINITIONS AND EXPLANATIONS

Population coverage. This report includes the civilian non-institutional population of the United States and approximately 1,000,000 members of the Armed Forces in the United States living off post or with their families on post, but excludes all other members of the Armed Forces.

Age. The age classification is based on the age of the person at the last birthday.

Race. The population is divided into three groups on the basis of race: White, Black, and "other races." The last category includes Indians, Japanese, Chinese, and any other race except White and Black.

Persons of Spanish origin. Persons of Spanish origin in this report were determined on the basis of a question that asked for self-identification of the person's origin or descent. Respondents were asked to select their origin (or the origin of some other household member) from a "flash card" listing ethnic origins. Persons of Spanish origin, in particular, were those who indicated that their origin was Mexican, Puerto Rican, Cuban, Central or South American, or some other Spanish origin. It should be noted that persons of Spanish origin may be of any race.

Marital status. The marital status classification identifies four major categories: single (never married), married, widowed, and divorced. These terms refer to the marital status at the time of the enumeration.

The category "married" is further divided into "married, spouse present," "separated," and "other married, spouse absent." A person was classified as "married, spouse present" if the husband or wife was reported as a member of the household, even though he or she may have been temporarily absent on business or on vacation, visiting, in a hospital, etc., at the time of the enumeration. Persons reported as separated included those with legal separations, those living apart with intentions of obtaining a divorce, and other persons permanently or temporarily separated because of marital discord. The group "other married, spouse absent" includes married persons living apart because either the husband or wife was employed and living at a considerable distance from home, was serving away from home in the Armed Forces, had moved to another area, or had a different place of residence for any other reason except separation as defined above.

Marital history. In addition to their current marital status, persons 14 years old and over were asked how many times they had been married; when they had married for the first time; whether that marriage had ended in widowhood or divorce and when that marriage had ended (if it was no longer intact); and if they had remarried, they were asked when they had entered their latest marriage and when that marriage had ended (if it was no longer intact). All dates were recorded in terms of month and year, and this detail was used in deriving age at each event or interval between events.

Family. The term "family," as used here, refers to a group of two persons or more related by blood, marriage, or adoption and residing together; all such persons are considered as members of one family. A lodger and his/her spouse who are not related to the person or persons who maintain the household, or a resident employee and his/her spouse living in, are considered as a separate family. Thus, a household may contain more than one family. However, if the son of the person or couple who maintains the household and the son's wife are members of the household, they are treated as part of the parent's family. A person maintaining a household alone, or with unrelated persons only, is regarded as a household but not as a family. Thus, some households do not contain a family.

Primary family. A primary family is a family that includes among its members the person or couple who maintains the household.

Secondary family. A secondary family is a family that does not include among its members the person or couple who maintains the household, or any persons related to the person or couple who maintains the household. Members of secondary families may include persons such as guests, lodgers, or resident employees and their relatives living in a household.

Subfamily. A subfamily is a married couple with or without children, or one parent with one or more own single children under 18 years old, living in a household and related to, but not including, the person or couple who maintains the household. The most common example of a subfamily is a young married couple sharing the home of the husband's or wife's parents. Members of a subfamily are also members of a primary family. The number of subfamilies, therefore, is not included in the number of families.

Own children. "Own" children in a family are sons and daughters, including stepchildren and adopted children, of the householder. Similarly, "own" children in a subfamily are sons and daughters of the person(s) maintaining the subfamily. For each type of family unit identified, the count of own children under 18 years old is limited to single (never married) children.

Children ever born. The question "How many babies has...ever had, if any? (Do not count stillbirths)" was asked of all women 14 to 49 years old who were reported as married (including separated), widowed, or divorced, and all women 18 to 49 years old who were reported single (never married). When asking about children ever born, interviewers were instructed to include children born to the woman before her present marriage, children no longer living, and children away from home as well as children who were still living in the home. It is possible that some never-married mothers living with one or more of their natural children reported themselves as having been married. In addition, many mothers who first married after the birth of one or more children counted those children, as they were expected to do. Nevertheless, data are probably less complete for births out of wedlock than for births within wedlock.

Years of school completed. Data on years of school completed in this report were derived from the combination of answers to two questions (a) "What is the highest grade of school this person has ever attended?" and (b) "Did this person finish this grade?"

The questions on educational attainment apply only to progress in "regular" schools. Such schools include graded public, private, and parochial elementary and high schools (both junior and senior high), colleges, universities, and professional schools, whether day schools or night schools. Thus, regular schooling is that which may advance a person toward an elementary school certificate or high school diploma, or a college, university, or professional school degree. Schooling in other than regular schools was counted only if the credits obtained were regarded as transferable to a school in the regular school system.

Metropolitan-nonmetropolitan residence. The population residing in standard metropolitan statistical areas (SMSA's) constitutes the metropolitan population. Except in New England, an SMSA is a county or group of contiguous counties which contain at least one city of 50,000 inhabitants or more, or "twin cities" with a combined population of at least 50,000. In addition to the county or counties containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city. In New England, SMSA's consist of towns and cities, rather than counties. The figures shown in this report for SMSA's are based on the SMSA's as defined on the basis of the 1970 census.

Central cities. Each SMSA must include at least one central city, and the complete title of an SMSA identifies the central city or cities. If only one central city is designated, then it must have 50,000 inhabitants or more. The area title may include, in addition to the largest city, up to two city names on the basis and in the order of the following criteria: (1) The additional city has at least 250,000 inhabitants or (2) the additional city has a population of one-third or more of that of the largest city and a minimum population of 25,000. An exception occurs where two cities have contiguous boundaries and constitute, for economic and social purposes, a single community of at least 50,000, the smaller of which must have a population of at least 15,000.

Geographic regions. The four major regions and nine Census divisions of the United States represent groups of States, as follows:

Northeast:

New England: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont.

Middle Atlantic: New Jersey, New York, Pennsylvania.

North Central:

East North Central: Illinois, Indiana, Michigan, Ohio, Wisconsin.

West North Central: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota.

South:

South Atlantic: Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia.

East South Central: Alabama, Kentucky, Mississippi, Tennessee.

West South Central: Arkansas, Louisiana, Oklahoma, Texas.

West:

Mountain: Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming.

Pacific: Alaska, California, Hawaii, Oregon, Washington.

Tenure. A housing unit is "owner occupied" if the owner or co-owner lives in the unit, even if it is mortgaged or not fully paid for. A cooperative or condominium unit is "owner occupied" only if the owner or co-owner lives in it. All other occupied units are classified as "renter occupied," including units rented for cash rent and those occupied without payment of cash rent. For renter-occupied units, information was also obtained as to whether the unit was publicly owned or subsidized by the Federal, State, or local government.

Occupation. The data on occupation refer to the job held during the survey week. Persons employed at two or more jobs were reported in the job at which they worked the greatest number of hours during the week.

The data on occupation refer to the job held longest during the income year.

The major occupation groups are combined into four divisions, as follows:

White-collar workers. Professional, technical, and kindred workers; managers and administrators, except farm; sales workers; and clerical and kindred workers.

Blue-collar workers. Craft and kindred workers; operatives, except transport; transport equipment operatives; and laborers, except farm.

Farm workers. Farmers and farm managers; and farm laborers and supervisors.

Service workers. Service workers, excluding private households; and private household workers.

The sequence in which these four divisions appear is not intended to imply that any division has a higher social or skill level than another.

Work experience. A person with work experience is one who, during the preceding calendar year, did any civilian work for pay or profit or worked without pay on a family-operated farm or business at any time during the year, on a part-time or full-time basis.

Weeks worked. Persons are classified according to the number of different weeks, during the preceding calendar year, in which they did any civilian work for pay or profit (including paid vacations and sick leave) or worked without pay on a family-operated farm or business.

Part-time or full-time jobs. A person is classified as having worked at part-time jobs during the preceding calendar year, if he worked at civilian jobs which provided less than 35 hours of work per week in a majority of the weeks in which he worked during the year. He is classified as having worked at full-time jobs if he worked 35 hours or more per week during a majority of the weeks in which he worked.

Year-round full-time worker. A year-round full-time worker is one who worked primarily at full-time civilian jobs for 50 weeks or more during the preceding calendar year.

Nonworker. A nonworker is one who did not do any civilian work in the calendar year preceding the survey.

Main reason for working part year. For persons who worked 49 weeks or less during the year, the main reason for working part year is based on the response to the question "What were you doing most of the remaining weeks?"

Main reason for not working. For persons who reported that they did not work at a civilian job for pay or profit or on a family-operated farm or business during the year, the main reason for not working is derived from the response to the question "What were you doing most of last year?"

Income. For each person in the sample 14 years old and over, questions were asked on the amount of money income received in the preceding calendar year from each of the following sources: (1) Money wages or salary; (2) net income from nonfarm self-employment; (3) net income from farm

self-employment; (4) Social Security or railroad retirement; (5) Supplemental Security income; (6) public assistance or welfare payments; (7) interest (on savings or bonds); (8) dividends, income from estates or trusts, or net rental income; (9) veterans' payments or unemployment and workmen's compensation; (10) private pensions or government employee pensions; (11) alimony or child support, regular contributions from persons not living in the household, and other periodic income.

When an indefinite amount was reported by the respondent, a specific value was assigned during processing wherever possible. If the indefinite amount was reported in terms of a range, the midpoint of the range was assigned (i.e., \$10,000 to \$15,000 was coded as \$12,500). Open-ended amounts were converted to designated specific amounts; e.g., over \$10,000 may be coded as \$15,000.

It should be noted that although the income statistics refer to receipts during the preceding year the characteristics of the person, such as age, labor force status, etc., and the composition of families refer to the time of the survey. The income of the family does not include amounts received by persons who were members of the family during all or part of the income year if these persons no longer resided with the family at the time of enumeration. On the other hand, family income includes amounts reported by related persons who did not reside with the family during the income year but who were members of the family at the time of enumeration.

Data on consumer income collected in the SIE by the Bureau of the Census cover money income received (exclusive of certain money receipts such as capital gains) before payments for personal income taxes, Social Security, union dues, Medicare deductions, etc. Therefore, money income does not reflect the fact that some families receive part of their income in the form of nonmoney transfers such as food stamps, health benefits, and subsidized housing; that many farm families receive nonmoney income in the form of rent-free housing and goods produced and consumed on the farm; or that nonmoney incomes are also received by some nonfarm residents which often take the form of the use of business transportation and facilities, full or partial payments by business for retirement programs, medical and educational expenses, etc. These elements should be considered when comparing income levels. Moreover, readers should be aware that for many different reasons there is a tendency in household surveys for respondents to underreport their income. From an analysis of independently derived income estimates, it has been determined that wages and salaries tend to be much better reported than such income types as public assistance, Social Security, and net income from interest, dividends, rents, etc.

The various sources for which income is reported are defined as follows:

Money wages or salary is total money earnings received for work performed as an employee during the income year. It includes wages, salary, Armed Forces pay, commissions, tips, piece-rate payments, and cash bonuses earned, before deductions were made for taxes, bonds, pensions, union dues, etc.

Net income from nonfarm self-employment is net money income (gross receipts minus expenses) from one's own business, professional enterprise, or partnership. Gross receipts include the value of all goods sold and services rendered. Expenses include costs of goods purchased, rent, heat, light, power, depreciation charges, wages and salaries paid, business taxes (not personal income taxes), etc. In general, inventory changes were considered in determining net income; replies based on income tax returns or other official records do reflect inventory changes. However, when values of inventory changes were not reported, net income figures exclusive of inventory changes were accepted. The value of saleable merchandise consumed by the proprietors of retail stores is not included as part of net income.

Net income from farm self-employment is net money income (gross receipts minus operating expenses) from the operation of a farm by a person on his own account, as an owner, renter, or sharecropper. Gross receipts include the value of all products sold, government crop loans, money received from the rental of farm equipment to others, and incidental receipts from the sale of wood, sand, gravel, etc. Operating expenses include cost of feed, fertilizer, seed, and other farming supplies, cash wages paid to farmhands, depreciation charges, cash rent, interest on farm mortgages, farm building repairs, farm taxes (not State and Federal income taxes), etc. The value of fuel, food, or other farm products used for family living is not included as part of net income. In general, inventory changes were considered in determining net income only when they were accounted for in replies based on income tax returns or other official records which reflect inventory changes, otherwise, inventory changes were not taken into account.

Social Security includes Social Security pensions and survivors' benefits, and permanent disability insurance payments made by the Social Security Administration prior to deductions for medical insurance and railroad retirement insurance checks from the U.S. Government. "Medicare" reimbursements are not included.

Supplemental Security income includes payments made by Federal, State, and local welfare agencies to low income persons who are (1) aged (65 years old or over), (2) blind, or (3) disabled.

Public assistance or welfare payments include public assistance payments such as aid to families with dependent children and general assistance.

Dividends, interest (on savings or bonds), income from estates or trusts, net rental income or royalties include dividends from stockholdings or membership in associations, interest on savings or bonds, periodic receipts from estates or trust funds, net income from rental of a house, store, or other property to others, receipts from boarders or lodgers, and net royalties.

Unemployment compensation, veterans' payments, or workmen's compensation include: (1) Unemployment compensation received from government unemployment

insurance agencies or private companies during periods of unemployment and any strike benefits received from union funds; (2) money paid periodically by the Veterans Administration to disabled members of the Armed Forces or to survivors of deceased veterans, subsistence allowances paid to veterans for education and on-the-job training, as well as so-called "refunds" paid to ex-servicemen as GI insurance premiums; and (3) workmen's compensation received periodically from public or private insurance companies for injuries incurred at work. The cost of this insurance must have been paid by the employer and not by the person.

Private and government employee pensions include: (1) Private pensions or retirement benefits paid to a retired person or his survivors by a former employer or by a union either directly or through an insurance company; (2) government employee pensions received from retirement pensions paid by Federal, State, county, or other governmental agencies to former employees (including members of the Armed Forces) or their survivors.

Annuities, alimony, regular contributions from persons not living in the household, and other periodic income include the following types of income: (1) Periodic receipts from annuities or insurance; (2) alimony and child support; (3) contributions received periodically from persons not living in the household; (4) other periodic income such as military family allotments, net gambling winnings, and other kinds of periodic income other than earnings.

Government transfer payments include Social Security, railroad retirement, public assistance or welfare payments, Supplemental Security income, retirement and annuities, veterans' payment, unemployment and workmen's compensation, etc.

Alimony and child support payments. Because of the design of the SIE questionnaire, data on the specific amounts of alimony or child support received are available for those women who reported receiving only one of these two types of income and no other miscellaneous income, such as regular contributions from outside the household and other sources not specifically enumerated in the SIE.

Alimony. Data for this source of income were tabulated for women who were either divorced or separated before 1950. They are based only on those women who reported that they received alimony payments. In the SIE no attempt was made to determine how many women were actually entitled to such benefits.

Child support payments. Data for this source of income were tabulated from women who were either divorced, separated, remarried, or never married with one or more own children under 18 years old present at the survey date. No attempt was made in this survey to determine the actual number of women who were entitled to child support payments.

Receipts not counted as income. Receipts from the following sources were not included as income: (1) Money received from the sale of property, such as stocks, bonds, a house, or

car (unless the person was engaged in the business of selling such property, in which case the net proceeds would be counted as income from self-employment); (2) withdrawals from bank deposits; (3) money borrowed; (4) tax refunds; (5) gifts; and (6) lump-sum inheritances or insurance payments.

Total money income. The algebraic sum of money wages and salaries, net income from self-employment, and income other than earnings represents total money income. The total income of a family is the algebraic sum of the amounts received by all income recipients in the family.

Median income. The median income is the amount which divides the distribution into two equal groups, one having incomes above the median, and the other having incomes below the median.

Mean income. The mean income is the amount obtained by dividing the total income of a group by the number of units in that group (families or persons). The means for families are based on all families. The means for persons are based on the number of persons with income. The mean for a particular type of income is based on the number of persons in families with that particular type of income.

Poverty (low-income) classification. Families and persons are classified as being above or below the poverty level using the poverty index adopted by a Federal Interagency Committee in 1969. This index is based on the Department of Agriculture's 1961 Economy Food Plan and reflects the different consumption requirements of families based on family size and composition, sex and age of the family head, and farm-nonfarm residence. It was determined from the Department of Agriculture's 1955 survey of food consumption that families of three or more persons spend approximately one-third of their income on food; the poverty level for these families was, therefore, set at three times the cost

of the economy food plan. For smaller families and persons living alone, the cost of the economy food plan was multiplied by factors that were slightly higher in order to compensate for the relatively larger fixed expenses of these smaller households. The poverty thresholds are updated every year to reflect changes in the Consumer Price Index (CPI).

Poverty thresholds are computed on a National basis only. No attempt has been made to adjust these thresholds for regional, State, or other local variations in the cost of living.

For a detailed definition of the poverty concept, see **Current Population Reports**, Series P-60, Nos. 110-113.

Alternate levels. Because the poverty definition currently in use by the Federal Government does not meet all the needs of the analysts of the data, additional data are presented for alternate definitions ranging from 75 percent to 125 percent of the current poverty level. Alternate cutoffs are obtained by multiplying the income cutoffs at the poverty level by the appropriate factor. For example, the income cutoff at 125 percent of the poverty level was \$6,875 in 1975 for a nonfarm family of four persons.

Poverty status excluding child support. The data on poverty for women receiving child support payments are presented in two ways. First, poverty status of women was determined based on their total income including child support payments. Second, their poverty status was recalculated by excluding the amount of child support payments received. The purpose of this analysis was to determine the additional number of women who would fall below the poverty line if they could not depend on child support payments.

Weighted average thresholds at the poverty level. The low-income cutoffs used by the Bureau of the Census to determine the low-income status of families and unrelated individuals consist of a set of 124 thresholds arranged in a

Table A-1. Weighted Average Thresholds at the Poverty Level in 1975 by Size of Family and Sex of Head, by Farm-Nonfarm Residence

Size of family unit	Total	Nonfarm			Farm		
		Total	Male head ¹	Female head ¹	Total	Male head ¹	Female head ¹
One person (unrelated individual).	\$2,717	\$2,724	\$2,851	\$2,635	\$2,305	\$2,396	\$2,224
2 to 4 years.....	2,791	2,797	2,902	2,685	2,396	2,466	2,282
5 years and over.....	2,572	2,581	2,608	2,574	2,196	2,216	2,187
Persons.....	3,485	3,506	3,515	3,460	2,955	2,963	2,834
Head 14 to 64 years.....	3,599	3,617	3,636	3,530	3,079	3,086	2,933
Head 65 years and over.....	3,232	3,257	3,260	3,237	2,772	2,772	2,770
Persons.....	4,269	4,293	4,317	4,175	3,643	3,652	3,480
Persons.....	5,469	5,500	5,502	5,473	4,695	4,697	4,616
Persons.....	6,463	6,499	6,504	6,434	5,552	5,552	5,595
Persons.....	7,272	7,316	7,322	7,270	6,224	6,230	6,105
Persons or more.....	8,939	9,022	9,056	8,818	7,639	7,639	7,647

¹For one person (i.e., unrelated individual), sex of the individual.

four-dimensional matrix consisting of family size (from one person, i.e., unrelated individuals, to seven or more person families) cross-classified by presence and number of family members under 18 years old (from no children present to six or more children present); sex of head, and farm-nonfarm residence. Unrelated individuals and two-person families are further differentiated by age of head (under 65 years and 65 years and over). The total family income of each family in the sample is tested against the appropriate dollar threshold to determine the low-income status of that family. If the family's total income is less than its corresponding cutoff, the family is classified as below the low-income level. The average thresholds shown in table A-1 were weighted by the presence and number of children. For example, for a given size of family, sex of head, and residence category, the weighted average threshold for that group is obtained by multiplying the threshold for each presence and number of children category within the given family size by the number of families in that category. These products are then aggregated across the entire range of presence and number of children categories, and the total aggregate is divided by the total number of families in the group to yield the weighted average threshold at the low-income level for that size family.

Because family composition varies by farm-nonfarm residence, the weighted average thresholds at the poverty level for farm families, as shown in table A-1 will not be exactly 85 percent of the nonfarm levels. Moreover, since family composition does not remain constant from year to year, the weighted average thresholds for 1975 will not reflect, identically, the change in the CPI between 1975 and earlier years.

Since the basic thresholds used to determine the low-income status of families and unrelated individuals are applied to all families and unrelated individuals, the weighted poverty thresholds are derived using all families and unrelated individuals rather than just those families and unrelated individuals classified as below the low-income level.

Symbols. A dash "--" represents zero or rounds to zero. The symbol "B" means that the base for the derived figure is less than approximately 60 sample cases for SIE data and less than 75,000 weighted cases for the CPS data. Three dots "..." mean not applicable, and "NA" means not available.

Rounding. Individual figures are rounded to the nearest thousand without being adjusted to group totals, which are independently rounded.

Base figures. The figures shown in this report were prepared by inflating weighted sample results to agree with independent estimates of the population based on statistics updated from the 1970 census.

SOURCE AND RELIABILITY OF THE ESTIMATES

Source of Data

Most of the estimates in this report are based on data obtained from the Bureau of the Census collected in the Current Population Survey (CPS), Survey of Income and Education (SIE), and the 1960 Census of Population. Other data are from Vital Statistics.

Current Population Survey (CPS). The CPS estimates are based on data obtained in June 1975 and March 1970, 1975, and 1978. The monthly CPS deals mainly with labor force data for the civilian noninstitutional population. Questions relating to labor force participation are asked every month about each member 14 years old and over in each sample household. In addition, supplementary questions are asked in most months about various population characteristics. Brief descriptions of the sources and the procedures by which the data were obtained are presented below.

The present CPS sample was initially selected from the 1970 census files and is updated continuously to reflect new construction where possible (see section "nonsampling variability" below). Samples for previous sample designs were selected from files from the most recently completed census. The monthly CPS sample is spread over 461 areas with coverage in each of the 50 States and the District of Columbia. A supplementary sample of housing units in 24 States and the District of Columbia was incorporated with the monthly CPS sample to produce the March 1978 data. The expanded CPS sample is located in 614 areas comprising 1,113 counties, independent cities, and divisions in the Nation. The 614 sample areas used in March 1978 include 461 areas from the monthly CPS and 153 supplementary areas.

Brief Description of the Current Population Survey

Time period	Number of sample areas	Housing units eligible		Housing unit visited not eligible
		Interviewed	Not interviewed	
Supplemental sample.....	153	8,500	500	1,50
Aug. 1972 to present.....	461	45,000	2,000	8,00
Aug. 1971 to July 1972.....	449	45,000	2,000	8,00
Jan. 1967 to July 1971.....	449	48,000	2,000	8,50

¹These are housing units which were visited, but were found to be vacant or otherwise not eligible for interview.

The estimation procedure used for the monthly CPS data involved the inflation of the weighted sample results to independent estimates of the civilian noninstitutional population of the United States by age, race, and sex. These independent estimates were based on statistics from decennial censuses; statistics on births, deaths, immigration, and emigration; and statistics on the strength of the Armed Forces. The estimation procedure in March for the data in this report also involves a further adjustment so that husband and wife in a household receive the same weight.

Survey of Income and Education (SIE). The SIE was a one-time survey of approximately 151,000 interviewed households nationwide, conducted in each State by the Bureau of the Census between April and July 1976. The purpose of the SIE was to provide estimates of the number of children 5 to 17 years old in poverty in each State and the District of Columbia, as required by the Education Amendments of 1974.

In addition to collecting income data needed to determine poverty status, the opportunity presented by such a large survey was also used to gather some additional income-related information not usually collected in the Census Bureau's current income surveys. Such data include the receipt of food stamps, housing costs for homeowners and renters, and estimated cash assets. Also, information relevant to a number of Department of Health, Education, and Welfare (HEW) programs was collected, including data on English language proficiency, school enrollment, public assistance reciprocity, housing tenure, liquid asset holdings, child and adult disability, and health insurance coverage. More detailed information on the SIE appear in **Current Population Reports**, Series P-60, Nos. 108 and 110 through 113 and series P-20, No. 334.

Vital statistics data. Data on divorces and divorce rates are published by the Division of Vital Statistics Analysis of the National Center for Health Statistics, Department of Health, Education and Welfare. The divorce rate in this report is defined as the number of divorces per 1,000 total population.

1960 Census of Population. Decennial census data in this report are based on complete counts or on the samples associated with the census as indicated in the list of sources. Descriptions of samples from the census are found in the appropriate census publications.

Reliability of the Estimates

Since the CPS and SIE estimates are based on a sample, they may differ somewhat from the figures that would have been obtained if a complete census had been taken using the same questionnaires, instructions, and enumerators. There are two types of errors possible in an estimate based on a sample survey—sampling and nonsampling. The standard errors provided for this report primarily indicate the magnitude of the sampling error. They also partially measure the effect of some nonsampling errors in response and enumeration, but do not measure any systematic biases in the data. The full

extent of nonsampling error is unknown. Consequently, particular care should be exercised in the interpretation of figures based on a relatively small number of cases or on small differences between estimates.

Nonsampling variability. Nonsampling errors can be attributed to many sources, e.g., inability to obtain information about all cases in the sample, definitional difficulties, differences in the interpretation of questions, inability or unwillingness on the part of respondents to provide correct information, inability to recall information, errors made in collection such as in recording or coding the data, errors made in processing the data, errors made in estimating values for missing data, and failure to represent all units with the sample (undercoverage).

Undercoverage in the CPS and SIE results from missed housing units and missed persons within sample households. Overall undercoverage, as compared to the level of the decennial census, is about 5 percent for CPS and slightly higher for SIE. It is known that the CPS and SIE undercoverage varies with age, sex, and race. Generally, undercoverage is larger for males than for females and larger for Blacks and other races than for Whites. Ratio estimation to independent age-sex-race population controls partially corrects for the bias due to survey undercoverage. However, biases exist in the estimates to the extent that missed persons in missed households or missed persons in interviewed households have different characteristics than interviewed persons in the same age-sex-race group. Further, the independent population controls used have not been adjusted for undercoverage in the 1970 census, which was estimated at 2.5 percent of the population, with similar undercoverage differentials by age, sex, and race as in CPS and SIE.

The approximate magnitude of the two sources of undercoverage of housing units is known. Of the 83,000,000 housing units in the United States about 600,000 conventional new construction housing units are not represented in the CPS sample because they were assigned building permits prior to January 1970, but building was not completed by the time of the 1970 census, (i.e., April 1970). Almost all conventional new construction, for which building permits were issued after 1969, is represented. About 290,000 occupied mobile homes are not represented in CPS; these units were either missed in the census or have been built or occupied since the census. These estimates of missed units are relevant to the present sample only and not to earlier designs where the extent of undercoverage was generally less. The extent of other sources of undercoverage of housing units is unknown but believed to be small.

Sampling variability. The standard errors given in the following tables are primarily measures of sampling variability, that is, of the variation that occurred by chance because a sample rather than the entire population was surveyed. The sample estimate and its estimated standard error enable one to construct confidence intervals, ranges that would include the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the

same general conditions and using the same sample design, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

The average estimate derived from all possible samples is or is not contained in any particular computed interval. However, for a particular sample, one can say with a specified confidence that the average estimate derived from all possible samples is included in the confidence interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

Comparability with other data. Data obtained from the CPS and SIE are not entirely comparable. This is due in large part to differences in survey objectives, month of interview, conditioning of respondents, mode of interview and interviewer experience. This is an additional component of error not reflected in the standard error tables. Therefore, caution should be used in comparing results between these different sources.

Caution should also be used in comparing estimates from 1978, when the expanded sample was used, to those from 1975 and 1970. Some relatively large differences in estimates of population in metropolitan and nonmetropolitan areas have been observed between the 461 and 614 area samples. These differences reflect a relatively large increase in variance on those estimates and do not represent actual changes in population.

Note when using small estimates. Summary measures (such as means, medians, and percent distributions) derived from CPS data are shown only when the base of the measure is 75,000 or greater. Summary measures derived from SIE data are shown if approximately 60 or more sample cases are present; a weighted cutoff cannot be used since the SIE sampling weights vary greatly by geographical area. Because of the large standard errors involved, there is little chance that summary measures would reveal useful information when computed on a smaller base. Estimated numbers are shown, however, even though the relative standard errors of

these numbers are larger than those for corresponding percentages. These smaller estimates are provided primarily to permit such combinations of the categories as serve each user's need.

Standard errors for data based on the 1960 census. Sampling errors on all data from the 25-percent sample of the decennial census shown in this report are small enough to be disregarded. However, the standard errors may be found in the appropriate census volumes.

Standard errors for data based on vital statistics. Since sample statistics are not involved in the numerator or denominator of any vital rate (divorce), the standard error of such a rate is zero.

Standard error tables and their use. In order to derive standard errors that would be applicable to a large number of estimates and could be prepared at a moderate cost, a number of approximations were required. Therefore, instead of providing an individual standard error for each estimate, generalized sets of standard errors are provided for various types of characteristics. As a result, the sets of standard errors provided give an indication of the order of magnitude of the standard error of an estimate rather than the precise standard error.

The figures presented in tables A-2 through A-5 are approximations to standard errors of the CPS estimates for families, unrelated individuals, and persons in the United States. Standard errors for intermediate values not shown in the generalized tables of standard errors may be approximated by linear interpolation. Two parameters (denoted as "a" and "b") are used to calculate standard errors for each type of characteristic; they are presented in table A-6. These parameters were used to calculate the standard errors in tables A-2 through A-5. They also may be used to directly calculate the standard errors for estimated numbers and percentages.

Table A-2. Standard Errors of Estimated Numbers of Families and Unrelated Individuals: CPS

Total or White
(Numbers in thousands)

Size of estimate	Standard error	Size of estimate	Standard error
75.....	10	2,500.....	56
100.....	11	5,000.....	79
250.....	18	10,000.....	109
500.....	25	25,000.....	162
1,000.....	35	35,000.....	184
		50,000.....	200

Note: To obtain approximate standard errors for families and unrelated individual of Black and other races, multiply the above standard errors by 1.0.

Table A-3. Standard Errors of Estimated Percentages of Families and Unrelated Individuals: CPS

Total or White

Size of estimated percentage (thousands)	Estimated percentage				
	2 or 98	5 or 95	10 or 90	25 or 75	50
5.....	1.9	2.9	4.0	5.7	7.0
10.....	1.5	2.4	3.4	5.0	5.7
25.....	1.0	1.5	2.2	3.1	3.6
50.....	0.7	1.1	1.5	2.2	2.5
100.....	0.6	0.8	1.1	1.5	1.8
250.....	0.3	0.4	0.7	1.0	1.1
500.....	0.2	0.3	0.4	0.7	0.8
1,000.....	0.2	0.2	0.3	0.4	0.6
2,500.....	0.10	0.2	0.2	0.3	0.3
5,000.....	0.07	0.11	0.2	0.2	0.2

Note: To obtain approximate standard errors for families and unrelated individuals of Black and other races, multiply the above standard errors by 1.0.

The figures presented in tables A-7 and A-8 are approximations to standard errors of the SIE estimates. To find the standard error of a percentage for a specific region, division, or the United States, multiply the standard error shown in table A-8 by the factor shown in table A-9. Two parameters denoted as "a" and "b" are used to calculate standard errors for regions and divisions; they are presented in table A-10. These parameters were used to calculate the standard errors in tables A-7 and A-8 and to calculate the factors in table A-9. They also may be used to directly calculate the standard errors for estimated numbers and percentages. Methods for direct computation are given in the following sections.

Standard errors of estimated numbers (CPS). The approximate standard error, σ_x , of an estimated number can be obtained in two ways. It may be obtained by interpolation from table A-2 or A-4. Alternatively, standard errors may be approximated by using formula (1), from which the standard errors in tables A-2 and A-4 were calculated. Use of this formula will provide more accurate results than the use of interpolation.

$$\sigma_x = \sqrt{ax^2 + bx} \quad (1)$$

where x is the size of the estimate and a and b are the parameters in table A-6 associated with the particular type of characteristic.

Standard errors of estimated numbers (SIE). The approximate standard error, σ_x , of an estimated number can also be obtained by use of formula (1) above, from which the standard errors were calculated in table A-7. Here x is the size of the estimate and a and b are the parameters in table A-10 associated with the United States, regions or divisions of the United States. When calculating the standard error of an estimate involving poverty, multiply the standard error as calculated above by 1.3.

Standard errors of estimated percentages. The reliability of an estimated percentage, computed using sample data for both numerator and denominator, depends upon both the size of the percentage and the size of the total upon which this percentage is based. Estimated percentages are relatively more reliable than the corresponding estimates of the numerators of the percentages, particularly if the percentages are 50 percent or more. When the numerator and denominator of the percentage are in different categories, use the parameters or factors from table A-6 for CPS or from tables A-9 or A-10 for SIE as indicated by the numerator. The approximate standard error, $\sigma_{(x,p)}$, of an estimated percentage can be obtained by use of the formula

$$\sigma_{(x,p)} = f\sigma \quad (2)$$

In this formula f is the appropriate factor from table A-9 for SIE and equals to 1.0 for CPS, and σ is the standard error of the numerator.

Table A-4. Standard Errors of Estimated Numbers of Persons: CPS

Total or White

(Numbers in thousands)

Size of estimate	Standard error	Size of estimate	Standard error
75.....	17	5,000.....	131
100.....	18	10,000.....	182
250.....	30	25,000.....	276
500.....	42	30,000.....	299
1,000.....	49	35,000.....	318
2,500.....	93	50,000.....	365
		75,000.....	413

Note: To obtain approximate standard errors for persons of Black and other races, multiply the above standard errors by 1.2.

error on the estimate from table A-3 or A-5 for CPS or from table A-8 for SIE. Alternatively, standard errors may be approximated by using formula (3) from which the standard errors in tables A-3 and A-5 for CPS and in table A-8 for SIE were calculated. Use of this formula will provide more accurate results than use of formula (2).

$$\sigma_{(x,p)} = \sqrt{\frac{b}{x} \cdot p (100 - p)} \quad (3)$$

Here x is the size of the subclass of persons or families and unrelated individuals which is the base of the percentage, p is the percentage ($0 < p < 100$), and b is the parameter in table A-6 or A-10 associated with the particular type of characteristic in the numerator of the percentage.

Illustration of use of standard error tables (CPS). Table 4 shows that in 1978 there were 5,206,000 families maintained by a woman with no husband present but with one or more of her own children under 18 years of age present. Table A-2 shows the standard error on an estimate of this size to be

approximately 81,000¹. The 68-percent confidence interval as shown by the data is from 5,125,000 to 5,287,000. Therefore, a conclusion that the average estimate derived from all possible samples lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate derived from all possible samples lies within the interval from 5,044,000 to 5,368,000 (using twice the standard error) with 95 percent confidence.

Of these 5,206,000 families maintained by a mother, 42.8 percent of the families were maintained by a divorced mother. From table A-6, the b parameter for computing standard errors is 1,389; using formula (3), the standard error on an estimate of 42.8 percent is

$$\sqrt{\frac{1,389}{5,206,000} (42.8) (100 - 42.8)} = 0.8 \text{ percent}$$

¹ Formula (1) gives a standard error of 83,000.

Table A-5. Standard Errors of Estimated Percentages of Persons: CPS

Total or White

Base of estimated percentage (thousands)	Estimated percentage				
	2 or 98	5 or 95	10 or 90	25 or 75	50
75.....	3.0	4.7	6.5	9.3	10.7
100.....	2.6	4.1	5.6	8.1	9.3
250.....	1.7	2.6	3.5	5.1	5.9
500.....	1.2	1.8	2.6	3.6	4.2
1,000.....	0.8	1.4	1.8	2.6	3.0
2,500.....	0.5	0.8	1.1	1.7	1.8
5,000.....	0.3	0.6	0.8	1.2	1.4
10,000.....	0.3	0.5	0.6	0.8	0.9
25,000.....	0.2	0.3	0.3	0.5	0.6
35,000.....	0.14	0.2	0.3	0.5	0.5
50,000.....	0.12	0.2	0.3	0.3	0.5
75,000.....	0.09	0.2	0.2	0.3	0.3

Note: To obtain approximate standard errors for persons of Black and other races, multiply the above standard errors by 1.2.

Table A-6. "a" and "b" Parameters for Estimated Numbers and Percentages of Persons, Household Heads, Families and Unrelated Individuals: CPS

Characteristic	Parameters			
	Persons		Household heads, families and unrelated individuals	
	a	b	a	b
MARITAL STATUS AND FAMILY COMPOSITION				
Total or White.....	-0.000017	3,500	-0.000010	1,389
Black and other races.....	-0.000210	5,020	-0.000087	1,255

Consequently, the 68-percent confidence interval is from 42.0 to 43.6 percent, and the 95-percent confidence interval is from 41.2 to 44.4 percent.

Illustration of use of standard error tables (SIE). Table 9 shows that in the North Central region the estimated number

of women either divorced, separated, remarried, or never married with one or more own children present at the survey date who reported the amount of child support they receive was 304,000. By linear interpolation, table A-7 shows the standard error on an estimate of this size to be approximately 16,500. Consequently, the 68-percent confidence

Table A-7. Standard Errors of Estimated Numbers of Totals, for the United States, Regions, and Divisions: SIE

Size of estimate	United States	Northeast			North Central		
		Total	New England	Middle Atlantic	Total	East North Central	West North Central
1,000.....	1,100	1,200	700	1,300	1,000	1,000	800
1,500.....	1,400	1,400	900	1,600	1,200	1,300	1,000
2,500.....	1,800	1,900	1,100	2,000	1,500	1,600	1,300
3,000.....	2,600	2,600	1,600	2,900	2,200	2,300	1,800
3,500.....	3,100	3,200	2,000	3,500	2,600	2,800	2,200
4,000.....	3,600	3,700	2,300	4,100	3,000	3,200	2,500
4,500.....	4,400	4,600	2,800	5,000	3,700	4,000	3,100
5,000.....	5,700	5,900	3,600	6,500	4,800	5,100	4,000
6,000.....	8,100	8,300	5,000	9,200	6,800	7,200	5,600
7,500.....	9,900	10,200	6,200	11,200	8,300	8,900	6,600
10,000.....	11,500	11,800	7,100	12,900	9,600	10,200	7,900
15,000.....	14,100	14,400	8,700	15,800	11,800	12,500	9,700
20,000.....	18,200	18,600	11,200	20,400	15,200	16,100	12,400
25,000.....	25,700	26,200	15,600	28,800	21,400	22,800	17,400
30,000.....	31,400	32,000	18,900	35,100	26,200	27,800	21,200
40,000.....	36,200	36,900	21,600	40,400	30,200	32,000	24,300
50,000.....	44,300	44,900	25,900	49,100	36,800	38,900	29,300
60,000.....	57,100	57,400	31,800	62,500	47,100	49,600	36,500
80,000.....	80,300	78,900	38,700	85,200	65,100	67,800	46,700
Size of estimate	South				West		
	Total	South Atlantic	East South Central	West South Central	Total	Mountain	Pacific
1,000.....	1,200	1,200	1,100	1,200	1,300	600	1,500
1,500.....	1,400	1,500	1,300	1,400	1,600	700	1,800
2,500.....	1,900	1,900	1,700	1,800	2,100	1,000	2,300
3,000.....	2,600	2,700	2,400	2,600	2,900	1,400	3,300
3,500.....	3,200	3,300	3,000	3,200	3,600	1,700	4,100
4,000.....	3,700	3,800	3,400	3,700	4,100	1,900	4,700
4,500.....	4,500	4,700	4,200	4,500	5,100	2,400	5,700
5,000.....	5,900	6,000	5,400	5,800	6,600	3,100	7,400
6,000.....	8,300	8,500	7,700	8,300	9,300	4,300	10,500
7,500.....	10,100	10,400	9,400	10,100	11,400	5,300	12,800
10,000.....	11,700	12,000	10,800	11,700	13,100	6,100	14,800
15,000.....	14,300	14,700	13,200	14,300	16,000	7,400	18,100
20,000.....	18,500	19,000	17,000	18,400	20,700	9,500	23,300
25,000.....	26,100	26,800	23,900	25,800	29,100	13,300	32,800
30,000.....	31,900	32,700	28,900	31,400	35,600	16,100	40,000
40,000.....	36,800	37,600	33,100	36,000	40,900	18,300	45,900
50,000.....	44,900	45,700	39,700	43,600	49,800	21,800	55,800
60,000.....	57,500	58,000	49,000	54,800	63,400	26,300	70,000
80,000.....	79,700	78,600	60,900	71,900	86,300	29,900	94,800

Note: To obtain approximate standard errors involving poverty, multiply the above standard errors by 1.3.

Table A-8. Standard Errors of Estimated Percentages of Totals: SIE

Base of percentage	Estimated percentage						
	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
25,000.....	2.3	3.2	5.0	6.9	8.2	10.0	11.5
50,000.....	1.6	2.3	3.5	4.9	5.8	7.0	8.1
75,000.....	1.3	1.9	2.9	4.0	4.7	5.7	6.6
100,000.....	1.1	1.6	2.5	3.5	4.1	5.0	5.7
150,000.....	0.9	1.3	2.0	2.8	3.4	4.1	4.7
250,000.....	0.7	1.0	1.6	2.2	2.6	3.2	3.6
500,000.....	0.5	0.7	1.1	1.5	1.8	2.2	2.6
750,000.....	0.4	0.6	0.9	1.3	1.5	1.8	2.1
1,000,000.....	0.4	0.5	0.8	1.1	1.3	1.6	1.8
1,500,000.....	0.3	0.4	0.7	0.9	1.1	1.3	1.5
2,500,000.....	0.2	0.3	0.5	0.7	0.8	1.0	1.2
5,000,000.....	0.16	0.2	0.4	0.5	0.6	0.7	0.8

Note: To obtain approximate standard errors involving poverty, multiply the above standard errors by 1.3. To obtain approximate standard errors for regions and divisions, multiply the above standard errors by the factors shown in table A-9.

interval is from 287,500 to 320,500 women. Therefore, a conclusion that the average estimate, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 271,000 to 337,000 women with 95 percent confidence.

Of these 304,000 persons, 85,000 or 28.0 percent reported receiving \$2,000 or more for child support. By linear interpolation, standard error table A-8 shows the preliminary standard error of 28.0 percent on a base of 304,000 to be approximately 3.0 percentage points. The factor for the North Central region from table A-9 is 0.839. Thus, the final standard error is 2.5 (3.0 x .839). Consequently, the 68-percent confidence interval is from 25.5 to 30.5 percent, and the 95-percent confidence interval is from 23.0 to 33.0 percent.

Standard error of a difference. For a difference between two sample estimates, the standard error is approximately equal to

$$\sigma_{(x-y)} = \sqrt{\sigma_x^2 + \sigma_y^2} \quad (4)$$

where σ_x and σ_y are the standard errors of the estimates x and y ; the estimates can be of numbers, percents, ratios, etc. This will represent the actual standard errors quite accurately for the difference between two estimates of the same characteristic in two different areas, or for the difference between separate and uncorrelated characteristics in the same area. If, however, there is a high positive (negative) correlation between the two characteristics, the formula will overestimate (underestimate) the true standard error.

Illustration of the computation of the standard error of a difference between estimated percentages. Table 4 shows

that of 5,206,000 families maintained by a mother, 23.6 percent were maintained by a separated mother. The apparent difference between the percent of families maintained by a divorced mother (42.8 percent) and those maintained by a separated mother is 19.2 percent. Using formula (3) and the b parameter from table A-6, the standard error (σ_y) on 23.6 percent is 0.5 percent. Therefore, using formula (4), the standard error of the estimated difference of 19.2 percent is about

$$\sqrt{(0.8)^2 + (0.7)^2} = 1.1$$

Thus, the 68-percent confidence interval for the difference is from 18.1 to 20.3 percent. Similarly, the 95-percent confidence interval for the difference is from 17.0 to 21.4 percent. Therefore, a conclusion that the average estimated difference, derived from all possible samples, lies within the range computed in this manner would be correct for 95 percent of all samples. Thus, we can conclude with 95 percent confidence that there is a difference between the percentage of families maintained by a divorced mother and the percentage of families maintained by a separated mother.

Standard error of a ratio. Certain mean values for persons in families shown in the tables were calculated as the ratio of two numbers. For example, the mean number of children per family is calculated as

$$\frac{x}{y} = \frac{\text{total number of children in families}}{\text{total number of families}}$$

Standard errors for these means may be approximated as shown below. The denominator y represents a count of families of a certain class, and the numerator x represents a count of persons with the characteristic under consideration who are members of these families.

Table A-9. Factors to be Applied to Generalized Standard Errors in Table A-8: SIE

Regions and divisions	Factor
United States.....	1.000
Northeast.....	1.027
New England.....	0.621
Middle Atlantic.....	1.128
North Central.....	0.839
East North Central.....	0.892
West North Central.....	0.690
South.....	1.021
South Atlantic.....	1.050
East South Central.....	0.948
West South Central.....	1.017
West.....	1.143
Mountain.....	0.533
Pacific.....	1.290

$$\sigma\left(\frac{x}{y}\right) = \sqrt{\left(\frac{x}{y}\right)^2 \left[\left(\frac{\sigma_y}{y}\right)^2 + \left(\frac{\sigma_x}{x}\right)^2\right]} \quad (5)$$

The standard error of the estimated number of families, σ_y , and the standard error of the estimated number of persons with the characteristic in those families, σ_x , may be calculated by the methods described above.

Standard errors of estimated means and medians. Estimated standard errors are provided for the means and medians of the published income distribution and do not need to be calculated by the user. However, some users may wish to combine two or more income distributions to compute means and medians for the combined distribution. The following sections are provided to enable the user to calculate standard errors for estimates of means and medians for the combined distributions.

Estimating the standard error of the mean. The standard error of a mean can be approximated by formula (6). Because of the approximations used in developing formula (6), an estimate of the standard error of the mean obtained from that formula will generally underestimate the true standard deviation. The formula used to estimate the standard error of a mean is

$$s_{\bar{x}} = \sqrt{\frac{b}{y} s^2} \quad (6)$$

where y is the size of the base and b is a constant which depends on the sample size, the sample design, the estimation procedure, and the type of characteristic. The b values are given in table A-6 or table A-10. The variance, s^2 , is given by formula (7):

$$s^2 = \sum_{i=1}^c p_i \bar{x}_i^2 - \bar{x}^2 \quad (7)$$

where \bar{x} is the mean of the distribution;

c is the number of groups; i indicates a specific group, thus taking on values 1 through c ,

p_i is the estimated proportion of families or persons whose values, for the characteristic (x -values) being considered fall in group i .

$\bar{x}_i = (Z_{i-1} + Z_i)/2$ where Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively for group i .

\bar{x}_i is assumed to be the most representative value for the characteristic for families or persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{x}_c = \frac{3}{2} Z_{c-1}$$

When two or more distributions are combined the mean of the combined distribution is:

$$\bar{x} = \frac{1}{y} \sum_j \bar{x}_j y_j$$

where \bar{x}_j is the mean of the j th distribution, y_j is the base of the j th distribution, and $y = \sum_j y_j$.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for

Table A-10. "a" and "b" Parameters for Estimated Numbers and Percentages of Persons: SIE

Regions and divisions	Parameters	
	a	b
United States....	-0.000006	1,319
Northeast.....	-0.000029	1,390
New England.....	-0.000042	509
Middle Atlantic.....	-0.000046	1,678
North Central.....	-0.000016	928
East North Central...	-0.000026	1,049
West North Central...	-0.000038	628
South.....	-0.000020	1,373
South Atlantic.....	-0.000044	1,456
East South Central...	-0.000088	1,183
West South Central...	-0.000066	1,365
West.....	-0.000046	1,721
Mountain.....	-0.000039	374
Pacific.....	-0.000079	2,190

measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the average median derived from all possible samples lies within the interval. The following procedure may be used to estimate the 68-percent confidence limits of a median based on sample data.

1. Determine, using the standard error tables and factors or formula (3), the standard error of the estimate of 50 percent from the distribution;
2. Add to and subtract from 50 percent the standard error determined in step (1);
3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step (2).

For calculation of the confidence interval use Pareto interpolation for any point in an income interval greater than \$1,000 in width, and linear interpolation otherwise. For the purpose of calculating standard errors linear interpolation gives approximately the same result as Pareto interpolation.

A 95-percent confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step (1).

The formulae used to implement step (3) for Pareto or linear interpolation are:

$$\text{Pareto: } x_{pN} = A_1 \exp \left[\ln \left(\frac{pN}{N_1} \right) \ln \left(\frac{A_2}{A_1} \right) / \ln \left(\frac{N_2}{N_1} \right) \right] \quad (8)$$

$$\text{Linear: } x_{pN} = \frac{N_1 - pN}{N_1 - N_2} (A_2 - A_1) + A_1 \quad (9)$$

where N = total number of families or persons in the distribution.

x_{pN} = estimated income for which the number pN , ($0 < p < 1$) of the families or persons in the distribution have larger incomes. For the purposes of calculating the confidence interval, p takes on the two values in step (2). Note that the median can be approximated by using $p=.50$ in the formulae.

A_1 and A_2 = the estimated incomes which are the lower and upper bounds, respectively, on the interval in which x_{pN} falls.

N_1 and N_2 = the estimated number of families or persons with incomes greater than A_1 and A_2 , respectively.

\exp = refers to the exponential function.

\ln = refers to the natural logarithm function.

It should be noted that a mathematically equivalent result is obtained by using common logarithms (base 10) and antilogs.

Illustration of the computation of a confidence interval for a median using linear interpolation. Table 8 shows that the median income in 1975 of currently divorced, separated, remarried, and never-married women in the United States who had at least one own child living with them was \$4,797. Table 8 also shows that the base of the distribution from which this median was determined is 4,408,000.

1. Using formula (3), the standard error of 50 percent on a base of 4,408,000 is about 0.9 percent.
2. To obtain a 95-percent confidence interval on the estimated median, add to and subtract from 50 percent twice the standard error found in step 1. This yields percent limits of 48.2 and 51.8.
3. From table 8, the income of 2,577,000 (or 58.5 percent) of these families is at least \$4,000 and the income of 2,109,000 (or 47.8 percent) of these families is at least \$5,000. Thus, the entire 95-percent confidence interval falls in the income interval \$4,000 to \$5,000. Therefore, the median income and the upper and lower limits on the confidence intervals are to be calculated using linear interpolation. Using formula (9), the lower limit on the estimate is found to be about

$$\frac{2,577,000 - (.518) (4,408,000)}{2,577,000 - 2,109,000} (\$5,000 - \$4,000) + \$4,000 = \$4,628$$

Similarly, the upper limit is found by linear interpolation to be about

$$\frac{2,577,000 - (.482) (4,408,000)}{2,577,000 - 2,109,000} (\$5,000 - \$4,000) + \$4,000 = \$4,966$$

Thus, the 95-percent confidence interval on the estimated median is from \$4,628 to \$4,966.

The confidence interval, as calculated above, for an estimated median may differ from one calculated using the standard errors present in the report. Rounding in the display of the standard errors in table A-8 and rounding in the computations in the example will primarily effect the length of the confidence interval (i.e., the upper minus the lower confidence limits). The reader should also note that for median incomes of \$18,000 or more, the method of calculating median income and standard errors described here will produce different results than the published values since the latter were calculated using Pareto interpolation. Further discussion on the Pareto technique can be found in the **Current Population Reports**, Series P-60, No. 118.

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Current Population
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Social and Economic Characteristics of the Older Population: 1978



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Series P-23, No. 85
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Current Population
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Social and Economic Characteristics of the Older Population: 1978



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ACKNOWLEDGMENTS

The basic draft of this report was prepared by **Jerry T. Jennings**, Demographic Statistician, Population Division. Technical and professional review of the draft was carried out by **Jacob S. Siegel**, Senior Demographic Statistician, Population Division. Statistical assistance was provided by **Carol Smith**, and secretarial assistance by **Katherine Italiano**. Work on this report was in part supported by the National Institute on Aging, National Institutes of Health, under a reimbursable agreement between the Census Bureau and the Institute.

Appreciation is also expressed to the other government agencies whose data were used in this report, including the Bureau of Labor Statistics, Law Enforcement Assistance Administration, and the National Center for Health Statistics.

Library of Congress Cataloging in Publication Data

United States. Bureau of the Census.
Social and economic characteristics of the older
population, 1978.

(Current population reports : Special studies :
Series P-23 ; no. 85)

Prepared by J. T. Jennings.

1. Aged—United States—Statistics. 2. Aged—
United States—Social conditions. 3. Aged—United
States—Economic conditions. I. Jennings, Jerry T.
II. Title. III. Series: United States. Bureau of
the Census. Current population reports : Special
studies : Series P-23 ; no. 85.

HA203.A218 no. 85 [HQ1064.U5] 312'.0973s
[301.43'5'0973] 79-8509

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Most of the data in this report are sample estimates based on the Current Population Survey and hence are subject to sampling, response, and processing errors and to errors in the assumptions used to estimate the final figures from the weighted sample. Information regarding the sampling error of these data is given in the publications cited in the source notes of the tables.

Meaning of Symbols

	Represents zero or rounds to zero.
B	Base less than 75,000.
...	Not applicable.
NA	Not available.
Z	Rounds to less than 0.05.

Social and Economic Characteristics of the Older Population: 1978

INTRODUCTION

This report consolidates data on a variety of social and economic characteristics of the older population. All of these statistics were compiled by the Bureau of the Census or by the National Center for Health Statistics and are now presented in this publication as a convenience to the user. The data which were taken from Bureau of the Census reports were primarily collected in the 1978 Current Population Survey (CPS), although a few tables contain data from other Bureau surveys or for other years.

In the report, most of the material on the "older" population relates to persons 65 years old and over. However, tables in which data are classified by age often show data for persons 55 to 64 years and occasionally for persons 50 to 59 years old. Data for these younger age groups are included to facilitate comparison of characteristics of "elderly" persons with persons just before they enter the elderly age category.

The emphasis on the lower age limit of 65 for the data presented here is partially arbitrary and partially a recognition of factors which, over the years, have combined to make the attainment of 65 a milestone—for example, a time of retirement, Social Security benefits, Medicare coverage, income tax advantages, and reduction in transit fares and admission prices.

Among the social and economic variables considered in this report are family and marital status, institutionalization, nativity and parentage, mobility, residence, educational attainment, voting, labor force participation, occupation and industry, income and earnings, poverty status, housing, health, and crime victimization. A later report will examine the demographic aspects of aging and the older population in a broader perspective.

HIGHLIGHTS

- In 1978, there were 24.1 million persons in the United States 65 years and over, as compared with 20.1 million in 1970. Women outnumbered men in 1978 by 4.5 million.
- Most (63 percent) of these older Americans lived in families, 6 percent were institutionalized, and 30 percent lived alone.
- About 6.9 million women and 1.3 million men 65 and over were widowed.
- Nearly half of all Americans 65 years and over never attended high school; only 16 percent attended 1 or more years of college.
- In 1976, 62 percent of persons 65 years and over voted in the Presidential election compared with 49 percent of those 18 to 34 years old.
- One out of every 5 of the men 65 and over and 1 out of every 12 of the women 65 and over were in the labor force in 1978.
- The median income in 1977 of families with the head 65 years and over was \$9,121.
- About 3.2 million persons 65 years and over (or 14 percent of the total) lived in families or as unrelated individuals that had incomes below the poverty level in 1977. About 27 percent of older persons not living in families were poor in 1977.
- Nearly three-fourths (72 percent) of the householders 65 years and over owned their own homes in 1978.

Population

Since the turn of the century, the population 65 years and over has increased nearly 8 times, while the total population increased about 3 times. The earlier extremely high rate of increase in the older population has not continued; between 1970 and 1978, the number of persons 65 years and over increased by 20 percent, from 20.0 to 24.0 million. In 1900, persons 65 years and over constituted about 4 percent of the total population, while in 1978 they made up 11 percent of the total.

The number of women 65 years and over has grown faster than the number of men of this age. The numbers of men and women of this age group were quite similar in the early

years of this century, but women 65 and over now outnumber men by 4.5 million (14.3 million compared to 9.8 million). The number of older women has increased 22 percent since 1970, as compared with a 16 percent increase in the number of men of this age.

In 1978, Blacks 65 years and over numbered around 2 million and made up about 8 percent of all persons 65 and over. Between 1900 and 1978, the Black population 65 and over increased 7 to 8 times. Since 1970, the Black population 65 and over has risen by 28 percent, while the White population of this age increased by about 19 percent.

**Table 1. Population 50 Years and Over, by Race, Spanish Origin, Sex, and Age:
July 1, 1978, 1974, and 1970**

(In thousands. For meaning of symbols, see text)

Sex and age	All races			White			Black			Spanish origin ¹		
	1978	1974	1970	1978	1974	1970	1978	1974	1970	1978 ²	1974	1970 ³
Both sexes.....	56,547	53,299	49,915	50,961	48,263	45,333	4,909	4,525	4,167	1,551	(NA)	1,165
50 to 59 years.....	23,061	22,265	21,161	20,617	20,061	19,107	2,126	1,970	1,867	807	(NA)	559
60 to 64 years.....	9,432	9,201	8,666	8,544	8,300	7,852	793	822	744	226	(NA)	202
65 to 69 years.....	8,575	7,840	7,023	7,649	7,054	6,338	851	725	626	217	(NA)	164
70 and 71 years.....	2,843	2,503	2,420	2,587	2,297	2,199	231	184	201	53	(NA)	105
72 to 74 years.....	3,516	3,199	3,045	3,227	2,929	2,802	250	236	221	91	(NA)	135
75 years and over....	9,120	8,291	7,600	8,337	7,622	7,035	658	588	508	157	(NA)	135
Male.....	25,258	23,938	22,612	22,757	21,659	20,514	2,173	2,019	1,877	721	(NA)	552
50 to 59 years.....	11,063	10,671	10,158	9,928	9,644	9,196	988	912	865	387	(NA)	268
60 to 64 years.....	4,418	4,297	4,049	4,014	3,881	3,669	358	373	339	101	(NA)	96
65 to 69 years.....	3,803	3,474	3,137	3,398	3,126	2,828	365	312	277	100	(NA)	79
70 and 71 years.....	1,215	1,080	1,037	1,103	986	938	98	82	87	27	(NA)	49
72 to 74 years.....	1,469	1,330	1,284	1,337	1,208	1,176	111	106	99	35	(NA)	60
75 years and over....	3,290	3,086	2,947	2,977	2,814	2,707	253	234	210	71	(NA)	60
Female.....	31,287	29,358	27,302	28,205	26,604	24,817	2,735	2,506	2,287	829	(NA)	613
50 to 59 years.....	11,998	11,594	11,004	10,689	10,417	9,911	1,138	1,058	1,001	420	(NA)	291
60 to 64 years.....	5,014	4,903	4,618	4,531	4,419	4,183	436	449	405	124	(NA)	106
65 to 69 years.....	4,771	4,366	3,885	4,251	3,928	3,510	486	412	349	118	(NA)	85
70 and 71 years.....	1,628	1,424	1,383	1,484	1,311	1,261	132	102	112	26	(NA)	56
72 to 74 years.....	2,047	1,867	1,760	1,890	1,721	1,627	138	130	122	55	(NA)	75
75 years and over....	5,829	5,204	4,652	5,360	4,808	4,325	405	355	298	86	(NA)	75

¹Persons of Spanish origin may be of any race.

²March 1978. Current Population Survey.

³April 1, 1970.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-25, No. 721; 1970 Census of Population, Vol. II, 1C, "Persons of Spanish Origin;" and unpublished population estimates for 1978.

Family, Marital Status, and Fertility

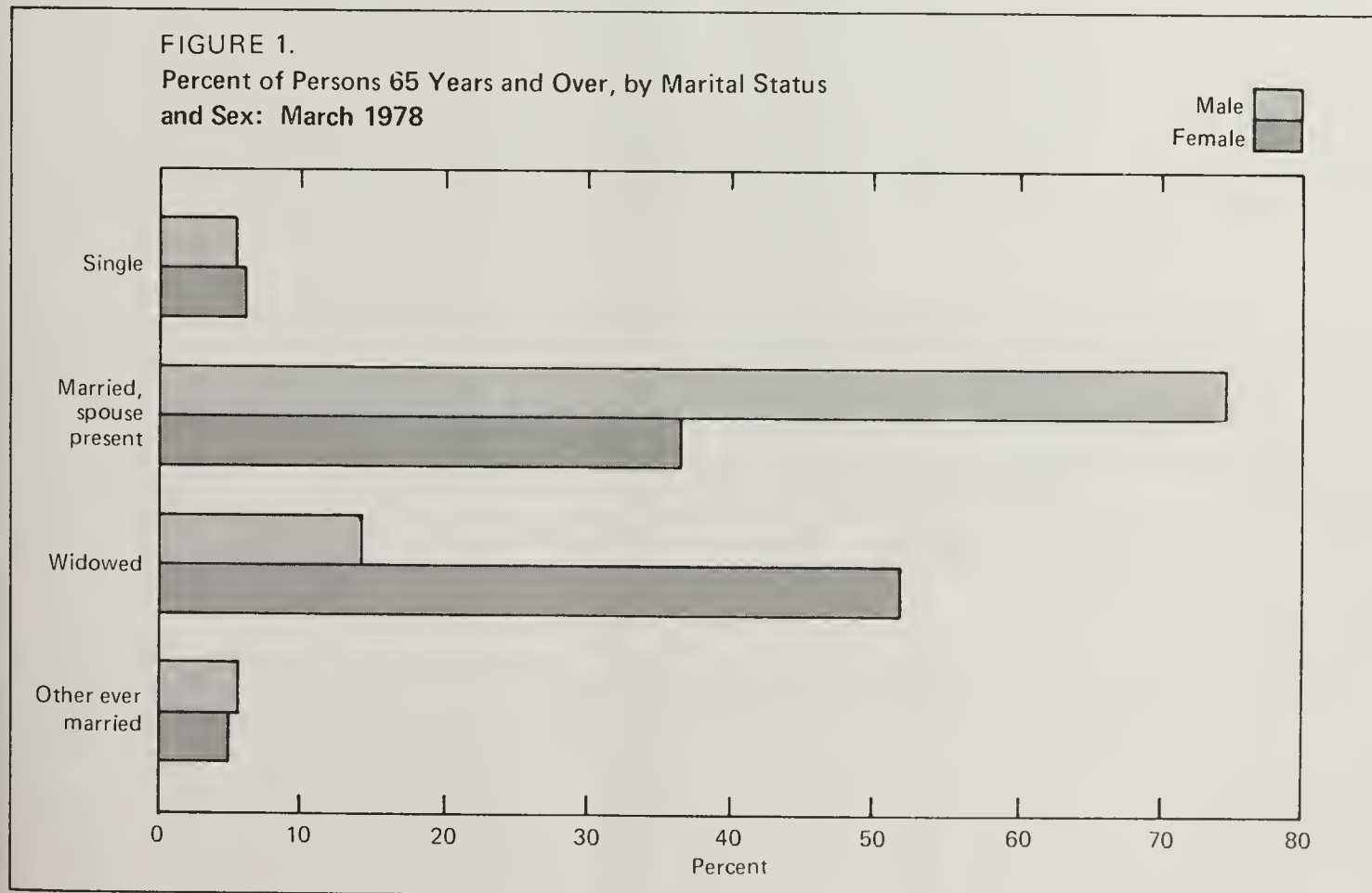
Most persons 65 years and over live in families, frequently one that has dwindled to an older couple with no children or other relatives living with them. However, the proportion of older men and women in families differs greatly. Because the mortality rate is much higher for older men than for older women, fewer older women continue to live in a family setting in their old age. In 1978, for example, 82 percent of men 65 years old and over who were living outside institutions lived in families, and 77 percent maintained their own families. Among women, however, only 57 percent of this age group still lived in families and only 36 percent were wives.

Among Blacks, a somewhat smaller proportion of men of this age were family members (69 percent) and a smaller proportion of women (27 percent) were wives. Black women, however, were much more likely to maintain families without a husband (21 percent) than White women (8 percent).

A large proportion of older persons maintain their own households alone or have only nonrelatives living with them. Such householders are usually persons whose immediate families have dissolved because their children have grown up and left home and their spouse has died. The remaining spouse, more frequently the wife than the husband, continues to maintain a household alone. In 1978, there were 7.0 million such primary individuals 65 years and over in the United States and they comprised 42 percent of all the women and 16 percent of all the men of the older population. The proportion of older persons living without any relative present rises to 49 percent for women 75 and over and 22 percent for men 75 and over.

The most common marital status for older men is to be married and living with their wives—75 percent in 1978; about 37 percent of older women lived with their husbands. For men 65 to 74 years of age, 78 percent were married and living with their wives; for men 75 and over, the proportion

FIGURE 1.
Percent of Persons 65 Years and Over, by Marital Status
and Sex: March 1978



was 68 percent. Although men usually marry at an older age, they die at a younger age than women; on the average, therefore, they spend a greater proportion of their lifetimes in the married state.

Among older women, the major reason for being unmarried is the death of their husband. In 1978, 52 percent of the women 65 years and over and 69 percent of those 75 and

over were widowed. Among men, the corresponding proportions were 14 percent and 23 percent, respectively.

Older women 65 to 74 years old had borne an average of 2.4 children. White women 65 to 74 years had borne fewer children on the average than had Black women of the same age. The figures were about 2.3 children for White women and 2.7 for Black women.

**Table 2. Family Status of Persons 55 Years and Over, by Race, Spanish Origin, Age, and Sex:
March 1978**

(Noninstitutional population. For meaning of symbols, see text)

Race, Spanish origin, and family status	55 years and over			55 to 64 years			65 to 74 years			75 years and over		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
ALL RACES												
Total.....thousands..	42,977	18,939	24,038	20,509	9,769	10,740	14,269	6,080	8,189	8,199	3,090	5,109
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
In families.....	75.6	85.7	67.6	84.5	89.1	80.3	71.7	84.9	61.9	60.0	76.6	50.0
Head of family.....	40.8	81.3	8.8	45.4	85.5	8.9	38.9	79.9	8.5	32.4	70.8	9.2
Wife of head.....	27.9	...	49.9	35.0	...	66.8	26.2	...	45.7	13.2	...	21.2
Other family member.....	6.9	4.4	8.8	4.1	3.6	4.6	6.6	5.0	7.7	14.4	5.8	19.6
Primary individual.....	23.0	12.6	31.3	14.1	9.1	18.6	26.8	13.3	36.9	38.9	22.1	49.1
Living alone.....	22.2	11.9	30.3	13.4	8.4	18.0	26.0	12.8	35.8	37.7	21.3	47.6
Secondary individual.....	1.4	1.7	1.1	1.5	1.8	1.2	1.5	1.7	1.3	1.1	1.3	0.9
In group quarters.....	0.3	0.2	0.4	0.3	0.2	0.4	0.4	0.2	0.5	0.2	0.3	0.2
WHITE												
Total.....thousands..	38,846	17,110	21,736	18,530	8,861	9,669	12,836	5,441	7,395	7,480	2,808	4,672
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
In families.....	76.1	87.0	67.5	85.2	90.1	80.7	72.2	86.5	61.6	60.0	77.8	49.3
Head of family.....	40.8	83.0	7.7	45.4	86.6	7.6	39.2	82.6	7.2	32.6	72.6	8.5
Wife of head.....	28.8	...	51.4	36.0	...	69.0	27.1	...	47.1	13.7	...	21.9
Other family member.....	6.4	4.0	8.4	3.9	3.6	4.2	5.9	4.0	7.2	13.7	5.2	18.9
Primary individual.....	22.8	11.8	31.4	13.4	8.2	18.2	26.8	12.6	37.2	39.2	21.7	49.8
Living alone.....	22.1	11.3	30.6	12.8	7.6	17.6	26.1	12.2	36.3	38.3	21.2	48.5
Secondary individual.....	1.2	1.2	1.1	1.4	1.7	1.1	1.1	0.9	1.2	0.8	0.5	0.9
In group quarters.....	0.3	0.1	0.4	0.3	0.2	0.5	0.3	0.1	0.5	0.2	0.2	0.2
BLACK												
Total.....thousands..	3,666	1,597	2,069	1,736	778	958	1,306	575	731	624	244	380
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
In families.....	69.7	72.7	67.4	75.5	76.2	74.8	66.8	71.0	63.5	59.9	65.6	56.3
Head of family.....	39.9	64.6	20.7	45.1	73.0	22.4	36.4	57.6	19.8	32.5	54.5	18.2
Wife of head.....	19.7	...	35.0	24.7	...	44.8	18.1	...	32.4	9.3	...	15.3
Other family member.....	10.1	8.1	11.7	5.6	3.2	7.6	12.2	13.4	11.2	18.1	11.1	22.9
Primary individual.....	26.5	20.7	31.0	22.0	20.2	23.5	28.1	19.8	34.5	35.9	24.6	43.2
Living alone.....	24.4	18.8	28.7	20.5	17.9	22.7	25.7	18.3	31.5	32.7	23.4	38.7
Secondary individual.....	3.7	6.6	1.6	2.5	3.6	1.8	5.1	9.2	2.1	4.2	9.8	0.5
In group quarters.....	0.5	1.0	(Z)	0.1	0.3	-	0.8	1.6	0.1	0.8	2.0	-
SPANISH ORIGIN¹												
Total.....thousands..	1,098	505	592	580	273	306	361	161	200	157	71	86
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
In families.....	82.0	87.1	77.7	87.2	91.9	83.3	78.1	85.1	72.5	71.3	(B)	69.8
Head of family.....	41.3	76.4	11.7	44.7	81.7	11.8	40.2	75.2	12.5	31.8	(B)	9.3
Wife of head.....	24.0	...	44.6	30.7	...	58.2	21.1	...	38.0	6.4	...	11.6
Other family member.....	16.6	10.5	21.8	11.9	10.3	13.4	16.6	9.3	22.5	33.8	(B)	50.0
Primary individual.....	16.0	11.9	19.9	10.9	6.6	14.7	20.5	15.5	25.0	24.8	(B)	26.7
Living alone.....	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
Secondary individual.....	1.9	1.2	2.5	1.9	1.5	2.3	1.4	-	2.5	3.2	(B)	3.5
In group quarters.....	0.6	-	1.2	0.2	-	0.3	1.1	-	2.0	1.3	(B)	2.3

¹Persons of Spanish origin may be of any race.

Source: U. S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 338.

Table 3. Households With Head 55 Years and Over, by Race, Spanish Origin, and Age: March 1978

(In thousands. Noninstitutional population)

Race, Spanish origin, and age of head	All households	Primary families				Primary individuals	
		Total	Husband- wife	Male head, no wife present	Female head, no husband present	Male	Female
ALL RACES							
Head, 55 years and over.....	27,408	17,503	14,851	541	2,111	2,380	7,527
55 to 64 years.....	12,183	9,299	8,071	276	952	888	1,996
65 to 74 years.....	9,383	5,554	4,713	146	695	810	3,020
75 years and over.....	5,842	2,650	2,067	119	464	682	2,511
WHITE							
Head, 55 years and over.....	24,710	15,859	13,748	452	1,659	2,017	6,835
55 to 64 years.....	10,884	8,402	7,439	232	731	723	1,759
65 to 74 years.....	8,462	5,027	4,363	129	535	685	2,750
75 years and over.....	5,364	2,430	1,946	91	393	609	2,326
BLACK							
Head, 55 years and over.....	2,431	1,459	958	73	428	331	642
55 to 64 years.....	1,163	781	528	40	213	157	225
65 to 74 years.....	842	476	315	16	145	114	253
75 years and over.....	426	202	115	17	70	60	164
SPANISH ORIGIN ¹							
Head, 55 years and over.....	630	453	364	20	69	59	117
55 to 64 years.....	321	258	210	12	36	18	45
65 to 74 years.....	220	145	116	4	25	25	49
75 years and over.....	89	50	38	4	8	16	23

¹Persons of Spanish origin may be of any race.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 338.

Table 4. Families With Head 55 Years and Over, by Age, Race, Spanish Origin of Head, Size of Family, and Family Members by Age: March 1978

(In thousands. Noninstitutional population. For meaning of symbols, see text)

Race, Spanish origin, size of family, and age of members	Head, 55 years and over			Head, 55 to 64 years			Head, 65 to 74 years			Head, 75 years and over		
	All families	Husband-wife	Female head	All families	Husband-wife	Female head	All families	Husband-wife	Female head	All families	Husband-wife	Female head
ALL RACES												
Size of Family												
Total families.....	17,516	14,855	2,117	9,304	8,074	953	5,555	4,713	696	2,657	2,068	468
2 persons.....	12,116	10,278	1,455	5,437	4,637	601	4,408	3,802	505	2,271	1,839	349
3 persons.....	3,137	2,663	371	2,107	1,869	189	760	622	111	270	172	71
4 persons.....	1,287	1,093	162	1,003	898	88	206	159	39	78	36	35
5 persons.....	532	443	65	421	369	39	90	63	20	21	11	6
6 persons.....	244	207	36	181	163	18	56	40	15	7	4	3
7 persons or more.....	199	170	29	155	137	18	34	27	7	10	6	4
Age of Member												
Total members.....	45,356	38,125	5,803	26,059	22,626	2,725	13,211	10,977	1,845	6,086	4,522	1,233
Under 18 years.....	3,914	2,955	785	3,031	2,420	508	721	467	216	162	68	61
18 to 64 years.....	27,334	23,127	3,366	22,122	19,513	2,072	4,026	3,129	743	1,186	485	551
65 years and over.....	14,109	12,044	1,652	906	693	145	8,465	7,382	886	4,738	3,969	621
WHITE												
Size of Family												
Total families.....	15,867	13,748	1,664	8,404	7,439	731	5,028	4,363	536	2,435	1,946	397
2 persons.....	11,335	9,791	1,222	5,085	4,413	502	4,123	3,622	414	2,127	1,756	306
3 persons.....	2,762	2,397	278	1,885	1,708	136	648	541	81	229	148	61
4 persons.....	1,053	928	102	861	790	60	138	111	20	54	27	22
5 persons.....	417	365	33	337	307	19	68	49	13	12	9	1
6 persons.....	183	163	19	138	129	9	38	30	7	7	4	3
7 persons or more.....	115	104	10	97	92	5	12	10	1	6	2	4
Age of Member												
Total members.....	39,871	34,404	4,281	22,828	20,319	1,920	11,568	9,884	1,343	5,475	4,201	1,018
Under 18 years.....	2,813	2,297	392	2,324	1,964	277	416	300	86	73	33	29
18 to 64 years.....	24,171	20,908	2,551	19,735	17,750	1,535	3,424	2,735	555	1,012	423	461
65 years and over.....	12,887	11,198	1,337	768	604	108	7,729	6,849	702	4,390	3,745	527
BLACK												
Size of Family												
Total families.....	1,462	959	429	783	528	215	476	315	145	203	116	69
2 persons.....	702	439	216	316	196	95	255	163	79	131	80	42
3 persons.....	326	223	90	192	131	53	98	70	27	36	22	10
4 persons.....	210	143	59	122	90	27	64	44	19	24	9	13
5 persons.....	94	59	30	66	44	19	20	13	7	8	2	4
6 persons.....	56	41	15	39	32	7	17	9	8	-	-	-
7 persons or more.....	72	54	19	47	34	13	21	16	6	4	4	-
Age of Member												
Total members.....	4,866	3,204	1,457	2,794	1,910	775	1,508	989	472	564	305	210
Under 18 years.....	1,003	584	379	639	394	227	288	157	123	76	33	29
18 to 64 years.....	2,746	1,847	781	2,038	1,446	512	546	344	181	162	57	88
65 years and over.....	1,118	772	299	118	69	37	674	488	169	326	215	93
SPANISH ORIGIN¹												
Size of Family												
Total families.....	454	365	69	259	210	36	145	117	25	50	38	8
2 persons.....	223	174	36	102	76	17	86	71	14	35	27	10
3 persons.....	104	82	18	59	47	9	36	27	7	9	8	3
4 persons.....	55	45	8	42	36	6	9	7	1	4	2	1
5 persons.....	32	28	4	22	20	1	9	7	3	-	-	-
6 persons.....	19	16	3	16	13	3	3	3	-	-	-	-
7 persons or more.....	22	21	-	19	19	-	3	2	-	-	-	-
Age of Member												
Total members.....	1,457	1,185	210	917	771	113	417	321	77	123	93	2
Under 18 years.....	287	232	46	225	191	31	56	38	12	6	3	3
18 to 64 years.....	863	699	128	666	559	80	166	121	40	31	19	19
65 years and over.....	307	255	36	27	22	2	194	163	25	86	70	70

¹Persons of Spanish origin may be of any race.

Table 5. Married Couples with Husbands 55 Years and Over, by Race, Spanish Origin, and Age of Husband and Wife: March 1978

(In thousands. Noninstitutional population. For meaning of symbols, see text)

Race, Spanish origin, and age of husband	Total	Age of wife									
		Under 25 years	25 to 34 years	35 to 44 years	45 to 54 years	55 to 59 years	60 and 61 years	62 to 64 years	65 to 69 years	70 to 74 years	75 years and over
ALL RACES											
Husband, 55 years and over...	14,971	6	45	281	3,026	3,695	1,293	1,776	2,288	1,458	1,105
55 to 59 years.....	4,373	3	27	179	2,142	1,673	169	93	67	18	2
60 and 61 years.....	1,523	1	5	34	342	739	215	116	56	12	3
62 to 64 years.....	2,216	-	4	31	295	685	405	537	215	33	13
65 to 69 years.....	2,787	2	7	25	177	406	369	709	896	177	19
70 to 74 years.....	1,964	-	2	9	59	136	87	227	749	582	113
75 years and over.....	2,108	-	-	3	11	56	48	94	305	636	955
WHITE											
Husband, 55 years and over...	13,841	6	35	232	2,752	3,448	1,196	1,644	2,099	1,390	1,039
55 to 59 years.....	4,042	3	22	150	1,980	1,565	159	86	58	17	2
60 and 61 years.....	1,399	1	5	31	306	689	201	109	46	9	2
62 to 64 years.....	2,028	-	4	27	264	648	372	488	184	32	9
65 to 69 years.....	2,575	2	2	18	151	375	342	669	827	170	19
70 to 74 years.....	1,818	-	2	5	45	121	79	204	701	553	108
75 years and over.....	1,979	-	-	1	6	50	43	88	283	609	899
BLACK											
Husband, 55 years and over...	972	-	9	39	217	213	77	116	175	66	58
55 to 59 years.....	273	-	5	25	128	90	9	6	9	1	-
60 and 61 years.....	100	-	-	2	30	40	6	7	10	3	1
62 to 64 years.....	158	-	-	3	27	33	27	42	23	1	1
65 to 69 years.....	195	-	4	6	20	29	24	37	68	7	-
70 to 74 years.....	128	-	-	2	7	14	8	20	44	27	6
75 years and over.....	118	-	-	1	5	7	3	4	21	27	50
SPANISH ORIGIN ¹											
Husband, 55 years and over...	381	-	2	18	116	85	32	37	50	30	12
55 to 59 years.....	134	-	1	10	82	27	5	3	4	2	-
60 and 61 years.....	31	-	-	2	11	11	4	2	1	-	-
62 to 64 years.....	48	-	-	4	8	20	6	7	4	-	-
65 to 69 years.....	82	-	1	1	12	19	13	17	15	3	1
70 to 74 years.....	42	-	-	1	3	4	3	5	14	8	4
75 years and over.....	44	-	-	-	-	4	1	3	12	17	7

¹Persons of Spanish origin may be of any race.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 338.

Table 6. Marital Status of Persons 55 Years and Over, by Race, Spanish Origin, Sex, and Age: March 1978

(In thousands. Noninstitutional population)

Race, Spanish origin, and age	Male						Female					
	Total	Single	Married, wife present	Married, wife absent	Widowed	Divorced	Total	Single	Married, husband present	Married, husband absent	Widowed	Divorced
ALL RACES												
55 years and over.....	18,939	1,024	14,972	528	1,612	803	24,038	1,347	12,104	585	8,889	1,114
55 to 64 years.....	9,769	529	8,113	280	312	534	10,740	519	7,219	340	1,972	690
65 to 74 years.....	6,080	347	4,751	182	589	212	8,189	538	3,780	179	3,376	317
75 years and over.....	3,090	148	2,108	66	711	57	5,109	290	1,105	66	3,541	107
WHITE												
55 years and over.....	17,110	903	13,840	345	1,354	668	21,736	1,246	11,264	394	7,875	956
55 to 64 years.....	8,861	474	7,469	191	271	455	9,669	462	6,706	214	1,697	589
65 to 74 years.....	5,441	298	4,392	106	471	174	7,395	500	3,517	122	2,985	270
75 years and over.....	2,808	131	1,979	48	612	39	4,672	284	1,041	58	3,193	97
BLACK												
55 years and over.....	1,597	106	972	175	223	122	2,069	97	734	179	905	154
55 to 64 years.....	778	50	531	85	38	74	958	54	433	119	253	99
65 to 74 years.....	575	39	323	72	109	33	731	37	243	52	354	45
75 years and over.....	244	17	118	18	76	15	380	6	58	8	298	10
SPANISH ORIGIN¹												
55 years and over.....	505	21	382	33	41	27	592	32	282	43	193	43
55 to 64 years.....	273	9	213	21	12	17	306	11	186	29	53	27
65 to 74 years.....	161	7	125	9	11	9	200	17	84	12	74	13
75 years and over.....	71	5	44	3	18	1	86	4	12	2	66	3

¹Persons of Spanish origin may be of any race.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 338.

Table 7. Number of Children Ever Born to Women 65 to 69 and 70 to 74 Years, by Race and Spanish Origin: June 1975

(For meaning of symbols, see text)

Race, Spanish origin, and age	Women ever married (thousands)	Children ever born	
		Number (thousands)	Per 1,000 women ever married
ALL RACES			
65 to 74 years.....	7,142	16,910	2,368
65 to 69 years.....	4,148	9,642	2,324
70 to 74 years.....	2,994	7,268	2,428
WHITE			
65 to 74 years.....	6,471	15,058	2,327
65 to 69 years.....	3,718	8,448	2,272
70 to 74 years.....	2,753	6,610	2,401
BLACK			
65 to 74 years.....	612	1,643	2,685
65 to 69 years.....	394	1,082	2,746
70 to 74 years.....	218	561	2,573
SPANISH ORIGIN ¹			
65 to 74 years.....	154	644	4,182
65 to 69 years.....	86	289	3,360
70 to 74 years.....	68	355	(B)

¹Persons of Spanish origin may be of any race.

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1975 Current Population Survey data.

Institutional Population

Approximately 1 million persons 65 years old and over lived in long-term care institutions in 1976 (96 percent of these persons were in nursing homes). Few other elderly persons lived in institutions. This figure is about the same as that in 1970 and represents about 6 percent of the population 65 and over.

As a result of differing mortality between the sexes, women not only greatly outnumber men among the older population generally, but particularly among the population living in institutions. In 1976, women outnumbered men in institutions by more than 2 to 1. Of all institutionalized persons, 66 percent were over 65 years old and 41 percent were over 80 years old.

Table 8. Inmates of Long-Term Care Institutions, by Race, Sex, and Age: 1976

Race and sex	Total	65 to 99 years	18 to 64 years	Less than 18 years	Age not reported
NUMBER					
All races.....	1,550,100	1,027,850	334,120	151,530	36,600
Male.....	596,820	322,530	182,420	85,410	6,450
Female.....	947,880	703,150	151,250	64,750	28,730
White.....	1,410,020	970,070	292,750	115,350	31,850
Male.....	524,850	299,040	158,210	63,580	4,010
Female.....	885,170	671,030	134,540	51,760	27,840
Other races.....	134,670	55,610	40,920	34,810	3,330
Male.....	71,970	23,490	24,210	21,820	2,440
Female.....	62,710	32,120	16,710	12,990	890
Not reported.....	5,410	2,170	450	1,380	1,420
PERCENT					
All races.....	100.0	100.0	100.0	100.0	100.0
Male.....	38.5	31.4	54.6	56.4	17.6
Female.....	61.1	68.4	45.3	42.7	78.5
White.....	91.0	94.4	87.6	76.1	87.0
Male.....	33.9	29.1	47.4	42.0	11.0
Female.....	57.1	65.3	40.3	34.2	76.1
Other races.....	8.7	5.4	12.2	23.0	9.1
Male.....	4.6	2.3	7.2	14.4	6.7
Female.....	4.0	3.1	5.0	8.6	2.4
Not reported.....	0.3	0.2	0.1	0.9	3.9

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-23, No. 69.

Table 9. Inmates of Long-Term Care Institutions, by Type of Institution and Age: 1976

Type of facility	Total ¹	65 years old and over		
		Total	65 to 79 years	80 years and over
NUMBER				
Total.....	1,550,100	1,027,850	390,720	637,130
Nursing homes.....	1,182,670	989,340	368,370	620,970
Physically handicapped.....	37,780	2,280	1,360	920
Psychiatric.....	65,400	4,540	3,890	650
Mentally handicapped.....	189,210	5,690	4,370	1,320
All other.....	75,060	26,010	12,740	13,270
PERCENT				
Total.....	100.0	100.0	100.0	100.0
Nursing homes.....	76.3	96.3	94.3	97.5
Physically handicapped.....	2.4	0.2	0.3	0.1
Psychiatric.....	4.2	0.4	1.0	0.1
Mentally handicapped.....	12.2	0.6	1.1	0.2
All other.....	4.8	2.5	3.3	2.1

¹Total includes persons who did not report on age.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-23, No. 69.

Nativity and Parentage

The age distribution of the foreign-born population in the United States reflects the immigration policies of the past century. Following World War I, immigration from abroad was sharply curtailed. One result of that change in policy is the present concentration of foreign-born persons in the upper age range. In 1970, about one-third of all foreign-born

persons living in the United States were 65 years or over and they made up about 15 percent of the total population of that age. Since 1970, mortality in particular has tended to reduce these proportions. In 1975, about one-fourth of the foreign-born were 65 and over and they made up approximately 12 percent of the age group.

Table 10. Nativity and Parentage of the Total Population and the Population 65 Years and Over, by Sex: 1970

Nativity and parentage	Total	Male	Female
TOTAL POPULATION			
All ages.....	203,210	98,882	104,328
Median age.....	28.1	26.8	29.3
Persons 65 years and over.....	20,101	8,436	11,665
Percent of all ages.....	9.9	8.5	11.2
NATIVE OF NATIVE PARENTAGE			
All ages.....	169,635	82,989	86,646
Median age.....	24.4	23.5	25.3
Persons 65 years and over.....	13,126	5,440	7,686
Percent of all ages.....	7.7	6.6	8.9
NATIVE OF FOREIGN OR MIXED PARENTAGE			
All ages.....	23,956	11,489	12,467
Median age.....	47.3	46.2	48.2
Persons 65 years and over.....	3,900	1,606	2,293
Percent of all ages.....	16.3	14.0	18.4
FOREIGN BORN			
All ages.....	9,619	4,404	5,216
Median age.....	52.0	52.2	51.9
Persons 65 years and over.....	3,075	1,389	1,686
Percent of all ages.....	32.0	31.5	32.3

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. II, 1A, "National Origin and Language."

Table 11. Country of Origin of the Foreign-Born Population 14 Years and Over and 65 Years and Over, by Age: July 1975

(In thousands. Civilian noninstitutional population)

Country of origin	Total, 14 years and over	65 years and over		
		Total	65 to 74 years	75 years and over
Total, foreign born.....	9,777	2,625	1,339	1,285
China.....	290	61	45	17
Cuba.....	453	61	48	13
France.....	118	20	8	12
Germany.....	871	283	161	122
Greece.....	160	55	20	35
Italy.....	887	406	172	234
Japan.....	212	30	12	18
Korea.....	136	10	6	4
Mexico.....	1,134	135	77	58
Phillipines.....	301	36	32	4
Portugal.....	133	27	19	8
Other foreign born and Not reported.....	5,083	1,501	740	761

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1975 Current Population Survey data.

Mobility and Residence

The majority (62 percent) of Americans 65 and over live in the Nation's metropolitan areas. About equal proportions live in the central cities and the remainders of the metropolitan areas. Not many choose to change residence; only a small proportion move each year. Of the older Americans who moved between 1975 and 1978, nearly one-half remained within the same SMSA while about

one-fourth remained outside SMSA's. In this 3-year period, only about 14 percent of Americans 65 years and over moved to a different house. Within the age group, mobility was greater for those 65 to 74 years (15 percent) than for those 75 and over (12 percent). Men and women were about equally likely to have moved during the period.

**Table 12. Metropolitan-Nonmetropolitan Residence of Persons 55 Years and Over, by Sex and Age:
March 1978**

(Numbers in thousands. Noninstitutional population)

Residence	Both sexes				Male				Female			
	Total, 55 years and over	55 to 64 years	65 to 74 years	75 years and over	Total, 55 years and over	55 to 64 years	65 to 74 years	75 years and over	Total, 55 years and over	55 to 64 years	65 to 74 years	75 years and over
NUMBER												
Total.....	42,977	20,509	14,269	8,199	18,939	9,769	6,080	3,090	24,038	10,740	8,189	5,109
Metropolitan.....	27,557	13,557	8,984	5,016	12,019	6,471	3,726	1,822	15,536	7,086	5,257	3,193
Central city.....	12,580	5,880	4,234	2,466	5,304	2,732	1,689	883	7,276	3,149	2,545	1,582
Outside central city.....	14,977	7,677	4,750	2,550	6,715	3,739	2,037	939	8,260	3,937	2,712	1,611
Nonmetropolitan.....	15,418	6,951	5,284	3,183	6,920	3,297	2,355	1,268	8,502	3,655	2,930	1,917
PERCENT												
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Metropolitan.....	64.1	66.1	63.0	61.2	63.5	66.2	61.3	59.0	64.6	66.0	64.2	62.5
Central city.....	29.3	28.7	29.7	30.1	28.0	28.0	27.8	28.6	30.3	29.3	31.1	31.0
Outside central city.....	34.8	37.4	33.3	31.1	35.5	38.3	33.5	30.4	34.4	36.7	33.1	31.5
Nonmetropolitan.....	35.9	33.9	37.0	38.8	36.5	33.7	38.7	41.0	35.4	34.0	35.8	37.5

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 331.

Table 13. Mobility of Persons 55 Years Old and Over, by Sex and Age: March 1975 to March 1978

(In thousands. Noninstitutional population. For meaning of symbols, see text)

Mobility status	Both sexes				Male				Female			
	Total, 55 years and over	55 to 64 years	65 to 74 years	75 years and over	Total, 55 years and over	55 to 64 years	65 to 74 years	75 years and over	Total, 55 years and over	55 to 64 years	65 to 74 years	75 years and over
Total.....	42,977	20,509	14,269	8,199	18,939	9,769	6,080	3,090	24,038	10,740	8,189	5,109
Same house (nonmovers).....	36,384	16,999	12,167	7,218	16,124	8,157	5,204	2,763	20,259	8,841	6,962	4,456
Central cities of SMSA's.....	10,647	4,869	3,619	2,159	4,518	2,294	1,450	774	6,131	2,576	2,169	1,386
Balance of SMSA's.....	12,732	6,462	4,072	2,198	5,757	3,164	1,758	835	6,975	3,298	2,314	1,363
Outside SMSA's.....	13,003	5,668	4,475	2,860	5,850	2,700	1,996	1,154	7,154	2,968	2,479	1,707
Different house in the U.S. (movers).....	6,462	3,410	2,088	964	2,755	1,565	868	322	3,707	1,845	1,220	642
Within same SMSA.....	2,881	1,551	892	438	1,172	696	337	139	1,709	855	555	299
Within central city ¹	1,298	660	445	193	518	282	170	66	780	378	275	127
Within balance of SMSA.....	1,034	593	276	165	432	285	97	50	602	308	179	115
Central city to balance of SMSA	391	208	131	52	157	90	54	13	235	118	77	40
Balance of SMSA to central city	159	90	40	29	66	39	16	11	93	51	24	18
Between SMSA's.....	894	442	299	153	391	200	134	57	503	242	165	96
Between central cities.....	166	74	53	39	69	26	24	19	97	48	29	20
Between balances of SMSA's.....	346	175	105	66	150	80	43	27	194	94	61	39
Central city to balance of SMSA	251	120	100	31	111	53	52	6	139	66	48	25
Balance of SMSA to central city	132	74	41	17	60	40	15	5	72	34	26	12
From outside SMSA's to SMSA's....	280	141	90	49	126	75	39	12	152	65	50	37
To central cities.....	111	59	32	20	47	30	11	6	63	29	21	13
To balance of SMSA's.....	169	81	58	30	80	45	29	6	90	37	29	24
From SMSA's to outside SMSA's....	573	328	194	51	255	145	90	20	318	183	104	31
From central cities.....	280	150	105	25	123	65	49	9	160	86	57	17
From balance of SMSA's.....	293	178	89	26	133	81	41	11	158	97	47	14
Outside SMSA's at both dates.....	1,832	948	612	272	809	448	267	94	1,024	500	345	179
Movers from abroad.....	131	100	15	16	60	47	8	5	72	53	7	12
To central cities of SMSA's.....	67	54	4	9	26	21	3	2	40	33	1	6
To balance of SMSA's.....	54	38	8	8	28	22	4	2	25	16	4	5
To outside SMSA's.....	10	7	3	-	6	4	2	-	6	4	2	-

¹Includes movers between central cities of the same SMSA's.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 331.

Education

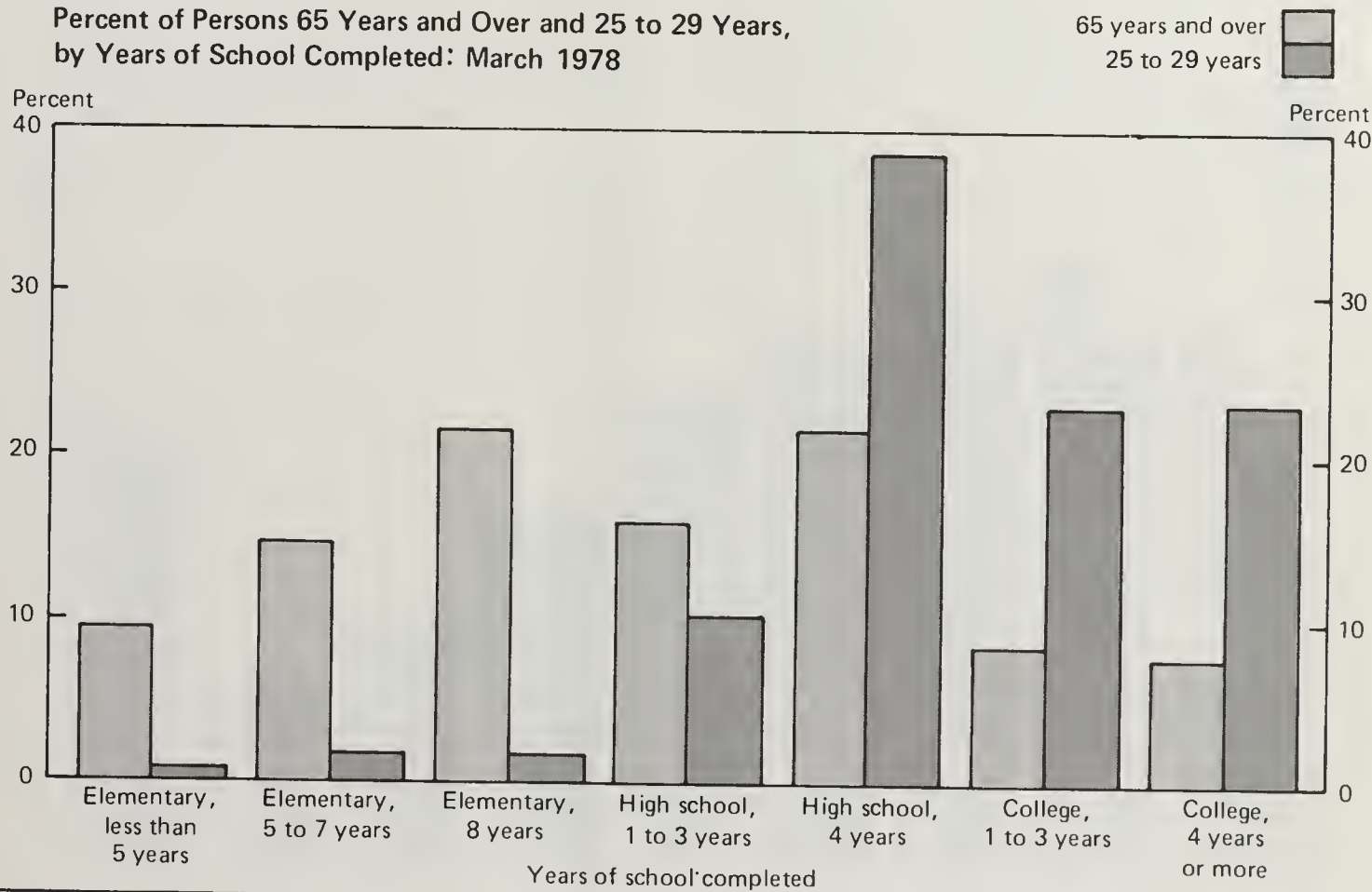
Nearly half of all Americans 65 and over never attended high school. As of 1978, 49 percent of men and 44 percent of women in this age group had stopped their formal schooling by the eighth grade, about one-third attended or completed high school, and about one-sixth attended or completed college. As better educated cohorts reach age 65 in future years, the average educational attainment level of older Americans can be expected to rise.

Nearly three times the proportion of older Blacks (58 percent) as Whites (21 percent) failed to complete ele-

mentary school. Correspondingly, the proportion of older Whites who attended or completed 4 years of college (18 percent) was substantially greater than the proportion of Blacks who did so (6 percent).

On the whole, older men are slightly less likely than older women to have attended high school, but slightly more likely to have attended or completed college. About 40 percent of older women have attended or completed high school, as compared with 34 percent of older men.

FIGURE 2.
Percent of Persons 65 Years and Over and 25 to 29 Years,
by Years of School Completed: March 1978



**Table 14. Years of School Completed by Persons 65 Years and Over, by Race, Spanish Origin, and Sex:
March 1978**

(Numbers in thousands. Noninstitutional population)

Years of school completed	All races		White		Black		Spanish origin ¹	
	Male	Female	Male	Female	Male	Female	Male	Female
NUMBER								
Total, 65 years and over.....	9,170	13,298	8,249	12,067	819	1,111	233	286
Elementary: Less than 5 years.....	989	1,163	649	818	307	305	96	136
5 to 7 years.....	1,505	1,838	1,264	1,524	215	289	40	59
8 years.....	1,959	2,867	1,861	2,697	78	158	27	27
High school: 1 to 3 years.....	1,371	2,219	1,280	2,027	84	179	21	20
4 years.....	1,746	3,118	1,649	2,980	82	113	26	26
College: 1 to 3 years.....	740	1,166	707	1,126	33	36	7	8
4 years or more.....	859	926	838	894	21	30	15	9
PERCENT								
Total, 65 years and over.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Elementary: Less than 5 years.....	10.8	8.7	7.9	6.8	37.5	27.5	41.2	47.6
5 to 7 years.....	16.4	13.8	15.3	12.6	26.3	26.0	17.2	20.6
8 years.....	21.4	21.6	22.6	22.4	9.5	14.2	11.6	9.4
High school: 1 to 3 years.....	15.0	16.7	15.5	16.8	10.3	16.1	9.0	7.0
4 years.....	19.0	23.4	20.0	24.7	10.0	10.2	11.2	9.1
College: 1 to 3 years.....	8.1	8.8	8.6	9.3	4.0	3.2	3.0	2.8
4 years or more.....	9.4	7.0	10.2	7.4	2.6	2.7	6.4	3.1

¹Persons of Spanish origin may be of any race.

Source: U.S. Department of Commerce, Bureau of the Census, unpublished Current Population Survey data.

Voting and Registration

Age is clearly one of the most significant variables affecting the likelihood that a person will vote in a Presidential or Congressional election. In the November 1978 Congressional election, for example, the percentage of older Americans who voted was 10 points higher than the percentage for the total voting-age population (56 percent versus 46 percent). In fact, persons 65 years and over outvoted all age groups under 45 years (56 percent versus 53 percent), while persons 75 and over outvoted those under 35 (48 percent versus 31 percent). At ages 65 and over, men outvoted women (63 percent versus 51 percent); at most younger ages, women outvoted men slightly. However, because older women outnumber older men, older women cast 1 million more votes in the 1978 election than did older men.

Over the past eight elections during which the Bureau of the Census has collected voting and registration data in its Current Population Survey, the voting proportion for most population groups has declined. For the total voting-age population, the decline has been around 10 percentage points for both Congressional and Presidential elections. Among older Americans, however, the decline was only 4 percentage points for Presidential elections; for Congressional elections, the decline was 10 points, as for the total electorate. For older Black Americans, the proportion voting in Presidential election years actually rose 9 points between 1964 and 1976, while the proportion for Congressional elections stayed in the 35-to-40-percent range.

FIGURE 3.

Percent Reported Voting of the Population of Voting Age,
by Sex and Age: November 1978

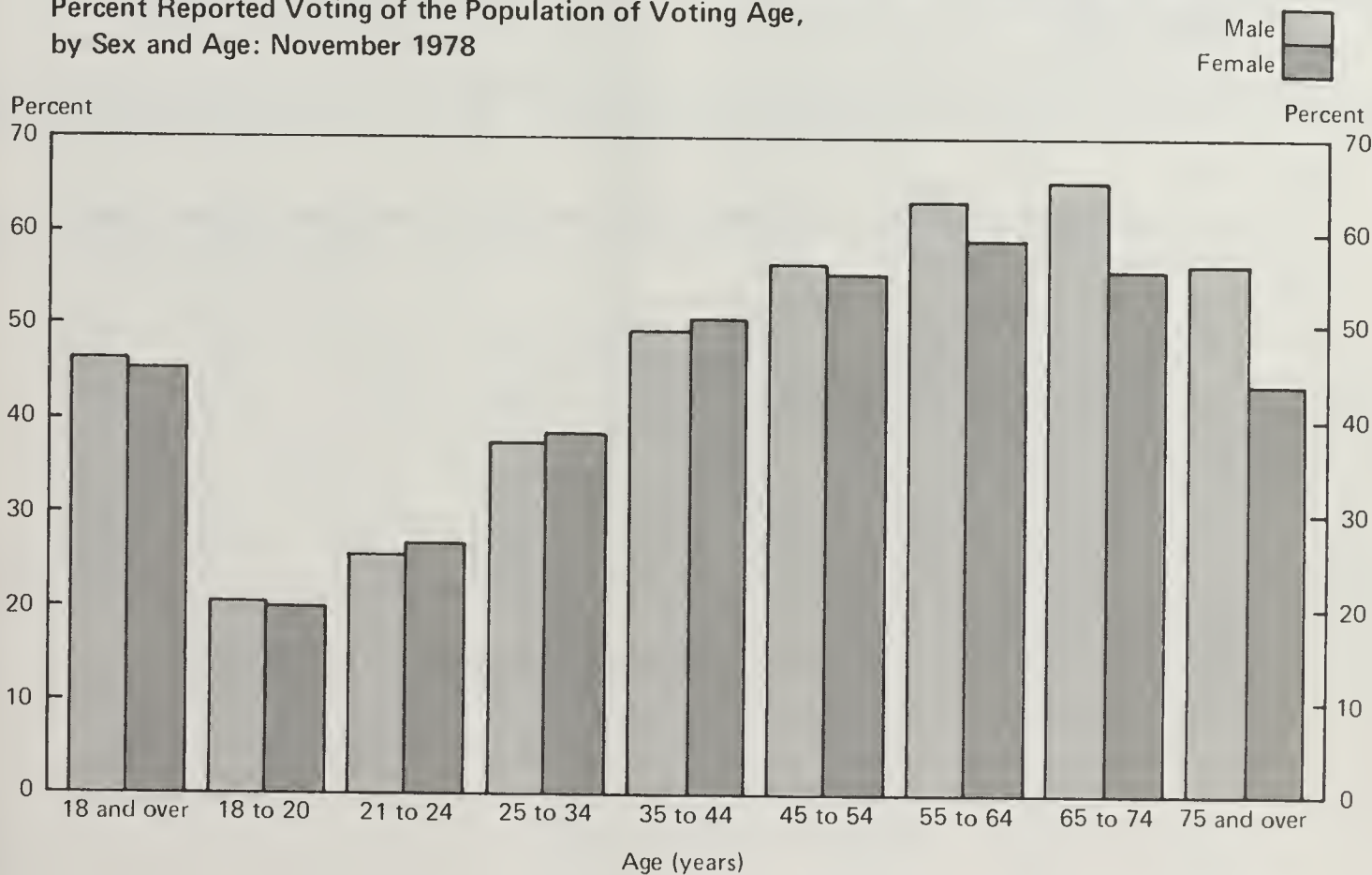


Table 15. Voting and Registration of Persons 65 Years and Over, by Sex and Age: November 1978

(Number in thousands. Civilian noninstitutional population)

Sex and age	Total	Reported registered		Reported voted		Reported that they did not vote ¹			
		Number	Percent	Number	Percent	Total	Registered	Not registered	
								Total ²	Do not know and not reported on registration
Both sexes, 65 years and over.....	23,001	16,752	72.8	12,868	55.9	10,133	3,884	6,251	1,286
65 to 69 years.....	8,469	6,449	76.1	5,159	60.9	3,309	1,291	2,020	405
70 to 74 years.....	6,260	4,686	74.9	3,699	59.1	2,562	986	1,576	301
75 years and over.....	8,272	5,617	67.9	4,010	48.5	4,262	1,607	2,655	580
Male, 65 years and over..	9,482	7,361	77.6	5,940	62.6	3,543	1,421	2,121	493
65 to 69 years.....	3,757	2,995	79.7	2,497	66.5	1,260	499	761	161
70 to 74 years.....	2,647	2,081	78.6	1,701	64.3	946	379	566	130
75 years and over.....	3,078	2,285	74.2	1,742	56.6	1,337	543	794	202
Female, 65 years and over	13,518	9,390	69.5	6,927	51.2	6,591	2,462	4,126	792
65 to 69 years.....	4,711	3,453	73.3	2,662	56.5	2,050	791	1,258	243
70 to 74 years.....	3,613	2,605	72.1	1,997	55.3	1,615	607	1,007	171
75 years and over.....	5,194	3,332	64.2	2,268	43.7	2,926	1,064	1,861	378

¹Includes persons who were recorded as "do not know" and "not reported" on voting.²Includes persons who were recorded as "do not know" and "not reported" on registration.Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 332.**Table 16. Voting and Registration of Persons 65 Years and Over, by Race and Spanish Origin: November 1978**

(Numbers in thousands. Civilian noninstitutional population. For meaning of symbols, see text)

Race and Spanish origin	Congressional elections				Presidential elections			
	1978	1974	1970	1966	1976	1972	1968	1964
Total, 65 years and over.....	23,001	20,955	19,141	17,817	22,001	20,074	18,468	17,269
PERCENT REPORTED VOTED								
Total.....	55.9	51.4	57.0	56.1	62.2	63.5	65.8	66.3
White.....	57.2	52.8	58.6	57.9	63.2	64.8	67.4	68.1
Black.....	45.6	38.5	39.3	35.3	54.3	50.6	49.9	45.3
Spanish origin ¹	24.9	28.1	(NA)	(NA)	29.9	26.7	(NA)	(NA)
PERCENT REPORTED REGISTERED								
Total.....	72.8	70.2	73.7	73.9	71.4	75.6	75.6	(NA)
White.....	73.7	71.2	75.0	75.5	72.5	76.5	77.1	(NA)
Black.....	67.6	62.9	61.5	56.2	64.5	67.9	62.7	(NA)
Spanish origin ¹	33.5	37.8	(NA)	(NA)	36.5	34.7	(NA)	(NA)

¹Persons of Spanish origin may be of any race.Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 332.

Labor Force Participation, Employment Status, and Occupation and Industry

Service industries employed the largest proportion of older nonagricultural workers in 1978. Approximately 34 percent of employed men 65 years and over and 51 percent of the employed women of that age worked in services such as business and repair services, doctors' offices and hospitals, education, or other professional services. Retail trade employed the next highest proportion of older workers—19 percent of the men and 26 percent of the women.

Manufacturing industries employed the highest proportion (32 percent) of men in the next younger age group (55 to 64 years old); service industries remained the predominant category for women workers of this age.

At age 55 and over, twice the proportion of men as women are in the labor force—48 percent and 23 percent, respectively. Within this broad age range, however, there is a large difference in the worker proportions of younger and older persons. Among men, the worker proportion drops from about 83 percent of those 55 to 59 years old to a figure about one-fourth of that, about 21 percent, for those 65 years and over. A similarly precipitous decline in labor force participation occurs among women, with the proportions

dropping from 49 percent of those 55 to 59 years to about 8 percent of those aged 65 and over. At the older ages, of course, the major reason for persons leaving the labor force is retirement from a job, especially for men. In 1978, about 75 percent of men 55 and over who were not in the labor force had retired. An additional 10 percent (1 million men) were unable to work. Retirement also takes a large number of women out of the labor force at these ages, but since a smaller proportion of women are employed before reaching the usual retirement ages, the extent to which retirement reduces their level of labor force participation is not as great as it is among men.

Among employed persons 55 years and over, the age distributions of men and women are remarkably similar. In 1978, about one-half of both employed men and women of this age range fell in the 55-to-59-year age group; only about 20 percent were 65 and over. Employed men 55 to 59 years old were about equally distributed between white-collar and blue-collar occupations. Employed women of this age were predominantly employed in white-collar occupations (57 percent) and only about 16 percent were engaged in

**Table 17. Major Industry Group of Employed Persons 65 Years and Over and 55 to 64 Years, by Sex:
1978 Annual Average**

(Excludes agricultural and private household workers. Noninstitutional population. For meaning of symbols, see text)

Industry group	Both sexes		Male		Female	
	65 years and over	55 to 64 years	65 years and over	55 to 64 years	65 years and over	55 to 64 years
Employed, total.....thousands..	2,454	10,616	1,576	6,528	879	4,089
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
Mining.....	0.5	0.8	0.7	1.2	0.2	0.2
Construction.....	5.8	5.8	8.5	8.8	0.8	1.0
Manufacturing.....	11.4	27.1	12.9	31.5	8.8	19.9
Transportation and public utilities.....	3.9	7.1	5.1	9.4	1.8	3.3
Trade.....	25.9	18.8	25.1	17.4	27.4	21.1
Wholesale.....	4.9	4.0	6.5	5.3	2.0	
Retail.....	21.0	14.8	18.6	12.1	25.5	15.8
Finance, insurance, and real estate.....	7.7	5.9	8.5	5.5	6.3	6.4
Miscellaneous service.....	40.3	27.9	34.4	18.6	50.7	42.8
Business and repair.....	5.9	3.3	7.5	3.8	3.1	2.4
Personal, excluding private household...	6.6	3.0	4.7	1.7	10.1	5.0
Entertainment and recreation.....	1.8	0.8	2.1	0.9	1.4	0.6
Medical, except hospital.....	5.2	3.3	3.9	1.6	7.7	6.0
Hospitals.....	3.4	3.9	1.6	1.4	6.5	7.8
Welfare and religious.....	5.3	1.9	3.9	1.5	7.8	2.7
Education.....	6.6	9.1	4.6	4.9	10.0	15.9
Other professional.....	5.3	2.5	5.9	2.6	4.1	2.4
Forestry and fisheries.....	0.1	0.1	0.1	0.2	-	(2)
Public administration.....	4.6	6.7	4.9	7.6	3.9	5.2

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

blue-collar occupations. More women than men were employed in service occupations, but more men than women worked in farm occupations. Among the 3 million workers 65 years and over, white-collar occupations clearly predominated for both men and women.

Men maintaining families, comprising the majority of men 55 years and over, exhibit employment and labor force characteristics similar to those of all men in the age group. In 1978, about one-half of the men 55 years and over maintaining families were in the labor force, and the vast majority of these were employed. Within the 55-and-over group, younger men are more likely to be active in the labor force (three-fourths of those 55 to 64 in 1978), while the older men are more likely to be retired (62 percent of those 65 and over in 1978). Only about 21 percent of men 65 and over maintaining families were employed in 1978.

Women 55 years and over who maintained families with no husband present in 1978, were less likely to be employed than to be keeping house; 29 percent were employed while 55 percent were keeping house. Only about 5 percent of all women of this age group maintaining families reported being retired. Among women 65 years and over maintaining families, only about 9 percent were employed.

The means of transportation to work of working persons 65 years and over is of interest both because of concerns of energy conservation and because such information indicates accessibility of older persons to means of transportation. In 1975, a majority of working men (about 62 percent) drove alone to work in a private automobile or truck, while nearly one-half of the working women (46 percent) drove to work alone. About one-third of the women used either public transportation or some means other than a private automobile.

Table 18. Labor Force Status and Major Activity of Persons 55 Years and Over, by Race, Sex, and Age:
1978 Annual Average

(Numbers in thousands. Noninstitutional population)

Race, sex, and age	Civilian labor force			Not in labor force by major reason			
	Total	Percent of population	Percent unemployed	Total	Keeping house	Unable to work	All other
ALL RACES							
Male, 55 years and over.....	9,126	47.6	2.6	10,061	224	1,010	8,827
55 to 59 years.....	4,404	82.7	2.2	919	18	298	602
60 to 64 years.....	2,760	63.0	2.9	1,621	28	235	1,358
65 years and over.....	1,962	20.7	3.1	7,521	178	477	6,867
Female, 55 years and over....	5,674	23.3	3.3	18,686	15,348	785	2,555
55 to 59 years.....	2,871	49.1	3.3	2,978	2,622	98	259
60 to 64 years.....	1,693	33.9	3.4	3,298	2,826	116	356
65 years and over.....	1,110	8.2	3.3	12,410	9,900	571	1,940
WHITE							
Male, 55 years and over.....	8,277	47.8	2.4	9,042	186	839	8,017
55 to 59 years.....	3,999	83.3	1.9	799	16	250	533
60 to 64 years.....	2,519	63.3	3.0	1,460	22	202	1,236
65 years and over.....	1,759	20.6	2.8	6,783	148	387	6,248
Female, 55 years and over....	5,053	23.0	3.0	16,952	14,081	623	2,248
55 to 59 years.....	2,573	49.1	2.9	2,666	2,371	70	225
60 to 64 years.....	1,514	33.6	3.1	2,994	2,589	92	313
65 years and over.....	966	7.9	3.2	11,292	9,121	461	1,710
BLACK							
Male, 55 years and over.....	737	45.5	4.3	885	32	156	697
55 to 59 years.....	347	75.9	5.1	110	2	46	62
60 to 64 years.....	213	59.8	1.9	143	5	30	108
65 years and over.....	177	21.9	5.5	632	25	80	527
Female, 55 years and over....	564	26.8	6.2	1,543	1,131	152	260
55 to 59 years.....	266	49.8	7.1	269	216	26	27
60 to 64 years.....	163	37.2	6.2	275	211	24	40
65 years and over.....	135	11.9	4.4	999	704	102	193

Source: U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 26, No. 1, and unpublished 1978 Current Population Survey data.

**Table 19. Major Occupation Group of Employed Persons 55 Years and Over, by Sex and Age:
1978 Annual Average**

(In thousands. Civilian noninstitutional population)

Major occupation group	Male						Female					
	Total, 55 years and over	55 to 59 years	60 and 61 years	62 to 64 years	65 to 69 years	70 years and over	Total, 55 years and over	55 to 59 years	60 and 61 years	62 to 64 years	65 to 69 years	70 years and over
Total.....	8,891	4,308	1,320	1,361	1,119	783	5,486	2,777	807	829	675	398
White-collar workers.....	3,904	1,913	557	608	490	336	3,124	1,639	458	478	338	211
Professional, technical, and kindred workers.....	1,122	549	152	175	151	95	695	355	114	111	69	46
Managers, and administrative, except farm.....	1,523	787	217	232	173	114	431	222	59	61	53	36
Sales workers.....	677	291	105	121	88	72	424	191	47	75	69	42
Clerical and kindred workers.....	580	286	82	80	78	54	1,574	870	238	232	148	86
Blue-collar workers.....	3,447	1,858	557	510	329	193	865	491	128	126	86	34
Craft and kindred workers.....	1,737	993	270	237	153	84	103	55	16	13	15	4
Operative, except transport.....	814	418	150	151	68	27	684	395	98	101	66	24
Transport equipment operatives....	454	244	72	64	49	25	26	16	6	2	2	-
Laborers, except farm.....	441	203	65	58	59	56	54	25	9	10	3	7
Service workers.....	869	327	131	131	164	116	1,382	592	208	211	228	143
Private household workers.....	6	1	3	-	1	1	352	106	42	56	83	65
Service workers, excluding private household.....	862	326	128	130	163	115	1,031	486	166	156	145	78
Farm workers.....	672	210	76	112	136	138	114	54	14	13	23	10
Farmers and farm managers.....	532	165	62	88	103	114	55	25	2	7	12	9
Farm laborers and supervisors.....	140	45	14	24	33	24	59	29	12	6	11	1

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

**Table 20. Employment Status of Primary Family Heads 55 Years and Over, by Race,
Sex, and Age: 1978 Annual Average**

(In thousands. Noninstitutional population)

Race, sex, and age	Total	In labor force		Not in labor force				
		Total	Employed	Total	Keeping house	Unable to work	Retired	All other
ALL RACES								
Male heads, 55 years and over.....	15,750	7,976	7,763	7,774	103	752	5,757	1,162
55 to 64 years.....	8,379	6,333	6,181	2,046	28	410	1,189	419
65 years and over.....	7,371	1,643	1,582	5,728	75	342	4,568	743
Female heads, 55 years and over.....	2,231	664	636	1,567	1,234	96	103	135
55 to 64 years.....	996	543	521	453	381	18	12	42
65 years and over.....	1,235	121	115	1,114	853	78	91	93
WHITE								
Male heads, 55 years and over.....	14,478	7,347	7,159	7,132	88	654	5,366	1,023
55 to 64 years.....	7,717	5,849	5,715	1,868	24	359	1,119	366
65 years and over.....	6,761	1,498	1,444	5,264	64	295	4,247	657
Female heads, 55 years and over.....	1,756	531	510	1,225	980	64	84	94
55 to 64 years.....	760	439	421	321	277	8	9	26
65 years and over.....	996	92	89	904	703	56	75	68
BLACK								
Male heads, 55 years and over.....	1,100	539	519	562	12	91	334	123
55 to 64 years.....	574	415	400	160	3	47	60	48
65 years and over.....	526	124	119	402	9	44	274	75
Female heads, 55 years and over.....	440	125	118	315	234	30	14	37
55 years to 64 years	221	98	93	123	97	10	2	15
65 years and over.....	219	27	25	192	137	20	12	22

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 21. Means of Transportation to Work of Employed Persons 65 Years and Over, by Sex and Residence: 1975

(In thousands. Persons in households)

Means of transportation to work	Male					Female				
	Total	In SMSA			Outside SMSA	Total	In SMSA			Outside SMSA
		Total	In central city	Outside central city			Total	In central city	Outside central city	
Total.....	1,379	838	382	456	540	819	555	276	279	264
Private automobile or truck.....	990	628	257	372	362	520	348	149	199	171
Drive alone.....	854	542	231	311	312	376	249	112	137	127
Carpool.....	136	86	22	60	50	143	99	37	62	44
Public transportation.....	100	95	69	26	6	116	108	83	25	8
Other means.....	288	115	56	59	173	184	99	43	55	85

Source: U.S. Department of Transportation, unpublished data from The Travel-to-Work Supplement to the 1975 Annual Housing Survey, National Sample.

Income and Earnings

Men 65 years and over who earned income in 1977 had a median income of \$5,526, compared with about \$12,243 for men 55 to 64 years old. This difference largely reflects the higher proportion of retirees in the older group. This pattern of age difference in reported income applied to both Whites and Blacks; in each of the two age groups, the median income for Blacks was considerably lower than for Whites.

Although women 65 and over with incomes in 1977 outnumbered men of this age with incomes, the median reported income of the women was considerably lower than for men. Median incomes were approximately \$4,533 for women 55 to 64 years old and \$3,087 for women 65 years and over. For men, reported incomes for the corresponding age groups were \$12,243 and \$5,526, respectively.

Single, widowed, or divorced persons 62 years and over who lived in families reported lower median incomes in 1977 than those living outside of families. Furthermore, family income tended to be lower when the older person was maintaining a family than when he or she lived in the family of a relative. This is because in the latter case the incomes of

the younger relatives are, on the average, higher than those of older persons.

Families maintained by a White woman 65 years and over with no husband present had median family incomes in 1977 that were somewhat higher (\$10,370) than those maintained by a White man whose wife was not in the paid labor force (\$8,672). However, this was not true for Black families. Among Blacks, husband-wife families had higher median incomes than Black families maintained by a woman. In both racial groups, highest family incomes occurred among husband-wife families in which both partners were in the paid labor force.

Unrelated individuals 65 and over in both racial groups also had low median incomes. Their median incomes were less than one-half that of families and also lower than that of the slightly younger single, widowed, or divorced persons 62 years and over referred to above. The median income of unrelated individuals in 1977 was about \$3,829. About 80 percent of such persons reported no income from earnings and were primarily dependent on Social Security income, either exclusively or in combination with sources of income other than earnings.

Table 22. Total Money Income in 1977 of Persons 55 Years and Over, by Race, Sex, and Age

(Persons as of March 1978. For meaning of symbols, see text)

Sex and income	All races			White			Black		
	55 years and over	55 to 64 years	65 years and over	55 years and over	55 to 64 years	65 years and over	55 years and over	55 to 64 years	65 years and over
MALE									
Number of persons.....thousands..	18,939	9,769	9,170	17,110	8,861	8,249	1,597	778	819
Number of persons with income.....thousands..	18,834	9,689	9,145	17,030	8,798	8,232	1,582	767	815
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
\$1 to \$999 or loss.....	1.4	1.9	1.0	1.4	1.9	0.8	2.1	1.6	2.7
\$1,000 to \$1,499.....	1.4	0.9	1.9	1.1	0.8	1.3	4.6	2.3	6.7
\$1,500 to \$1,999.....	1.9	1.2	2.7	1.6	1.0	2.2	5.2	3.0	7.2
\$2,000 to \$2,499.....	4.4	2.5	6.5	3.7	2.0	5.5	11.6	7.8	15.1
\$2,500 to \$2,999.....	3.6	1.7	5.6	3.3	1.5	5.2	6.1	3.7	8.5
\$3,000 to \$3,499.....	5.0	2.5	7.7	4.7	2.2	7.3	7.9	4.8	10.8
\$3,500 to \$3,999.....	5.0	2.6	7.6	4.7	2.2	7.4	7.7	6.0	9.3
\$4,000 to \$4,999.....	7.7	4.0	11.7	7.6	3.8	11.7	8.8	6.1	11.3
\$5,000 to \$5,999.....	7.3	4.3	10.4	7.1	3.9	10.5	9.5	8.8	10.1
\$6,000 to \$6,999.....	6.6	4.7	8.7	6.6	4.4	9.0	7.3	8.7	6.0
\$7,000 to \$7,999.....	5.7	5.0	6.5	5.8	4.8	6.8	4.8	6.5	3.2
\$8,000 to \$8,999.....	4.5	4.3	4.7	4.7	4.4	5.0	3.0	3.8	2.3
\$9,000 to \$9,999.....	4.1	4.4	3.7	4.1	4.3	3.9	4.0	6.4	1.7
\$10,000 to \$11,999.....	7.3	8.8	5.7	7.4	8.7	6.1	5.2	9.1	1.6
\$12,000 to \$14,999.....	8.8	12.7	4.7	9.1	12.9	5.1	5.2	9.5	1.1
\$15,000 to \$19,999.....	10.9	16.5	4.9	11.5	17.3	5.3	4.4	7.4	1.6
\$20,000 to \$24,999.....	5.8	9.2	2.2	6.2	9.8	2.4	1.4	2.2	0.6
\$25,000 and over.....	8.6	12.9	4.0	9.3	13.9	4.4	1.3	2.3	0.4
Median income.....dollars..	7,982	12,243	5,526	8,518	1,278	5,805	4,561	6,674	3,463
Mean income.....dollars..	11,564	14,895	8,035	12,089	15,499	8,444	6,166	8,134	4,313
FEMALE									
Number of persons.....thousands..	24,038	10,740	13,298	21,736	9,669	12,067	2,069	958	1,111
Number of persons with income.....thousands..	20,197	7,875	12,322	18,202	7,024	11,178	1,816	772	1,044
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
\$1 to \$999 or loss.....	6.1	10.3	3.4	5.8	10.1	3.2	8.4	12.6	5.3
\$1,000 to \$1,499.....	7.6	6.1	8.6	7.4	5.8	8.4	9.9	8.0	11.3
\$1,500 to \$1,999.....	10.2	7.3	12.1	10.2	7.1	12.1	11.0	8.9	12.5
\$2,000 to \$2,499.....	11.2	7.4	13.7	10.2	6.6	12.4	22.2	15.0	27.5
\$2,500 to \$2,999.....	8.4	5.3	10.4	8.2	5.1	10.2	10.7	7.3	13.3
\$3,000 to \$3,499.....	8.3	5.4	10.2	8.2	5.1	10.2	9.5	8.3	10.3
\$3,500 to \$3,999.....	6.6	3.8	8.4	6.7	3.8	8.4	5.7	3.5	7.3
\$4,000 to \$4,999.....	8.9	8.3	9.2	9.1	8.3	9.6	6.6	7.4	5.9
\$5,000 to \$5,999.....	6.7	7.5	6.3	6.9	7.3	6.6	5.5	9.1	2.8
\$6,000 to \$6,999.....	5.0	6.2	4.2	5.2	6.4	4.5	2.2	4.3	0.7
\$7,000 to \$7,999.....	4.1	5.4	3.2	4.3	5.7	3.3	2.1	2.9	1.6
\$8,000 to \$8,999.....	3.3	5.0	2.2	3.5	5.2	2.4	1.4	2.6	0.5
\$9,000 to \$9,999.....	2.3	3.5	1.6	2.5	3.7	1.7	0.8	1.4	0.3
\$10,000 to \$11,999.....	3.8	6.6	2.0	4.0	6.9	2.1	1.5	3.2	0.3
\$12,000 to \$14,999.....	3.5	5.5	2.2	3.7	5.9	2.4	1.4	2.8	0.4
\$15,000 to \$19,999.....	2.4	4.1	1.3	2.6	4.4	1.5	1.0	2.2	0.1
\$20,000 to \$24,999.....	0.8	1.2	0.5	0.8	1.3	0.5	0.3	0.4	0.2
\$25,000 and over.....	0.7	1.1	0.5	0.8	1.2	0.6	-	-	-
Median income.....dollars..	3,385	4,533	3,087	3,503	4,770	3,186	2,469	2,871	2,385
Mean income.....dollars..	4,906	5,957	4,234	5,070	6,175	4,375	3,321	4,083	2,757

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, No. 118.

Table 23. Total Money Income in 1977 of Persons 62 Years and Over, by Race, Spanish Origin, Marital and Family Status, and Age

(In thousands. Couples and persons 62 years old and over as of March 1978. For meaning of symbols, see text)

Race, Spanish origin, marital status, family status, and age	Total	With income												Median income (dollars)	Mean income (dollars)
		Total	\$1 to \$999 or loss	\$1,000 to \$1,999	\$2,000 to \$2,499	\$2,500 to \$2,999	\$3,000 to \$3,999	\$4,000 to \$4,999	\$5,000 to \$5,999	\$6,000 to \$7,999	\$8,000 to \$9,999	\$10,000 to \$14,999	\$15,000 and over		
ALL RACES															
Married Couples¹															
Total, 62 years and over ¹	9,500	9,485	49	56	102	138	549	619	823	1,565	1,171	1,881	2,532	9,340	12,828
62 to 64 years.....	2,450	2,443	20	23	26	28	75	79	127	242	230	542	1,052	12,965	16,428
65 to 71 years.....	3,819	3,817	16	15	48	53	193	203	274	665	522	821	1,005	9,618	12,794
72 years and over.....	3,232	3,225	12	18	28	57	280	337	422	657	420	518	475	7,242	10,141
Single, Widowed, or Divorced Persons															
Total, 62 years and over.....	12,361	12,204	152	1,052	1,619	1,359	2,572	1,349	1,030	1,165	624	743	540	3,747	5,329
In families.....	3,929	3,798	91	508	660	457	700	340	304	261	141	182	154	3,262	4,788
Male.....	847	827	28	79	115	82	130	71	77	75	42	47	82	3,851	6,412
62 to 64 years.....	175	167	7	17	16	14	15	11	20	21	10	12	25	5,243	7,601
65 to 71 years.....	330	319	10	31	38	18	62	34	33	27	18	20	28	4,000	6,770
72 years and over.....	342	341	11	31	60	50	53	27	24	27	14	14	28	3,344	5,496
Female.....	3,082	2,972	63	429	546	375	570	269	228	186	99	135	72	3,128	4,337
62 to 64 years.....	348	330	4	44	44	39	34	29	45	33	16	25	16	3,962	5,391
65 to 71 years.....	949	911	14	123	130	103	161	108	77	77	37	56	25	3,532	4,684
72 years and over.....	1,786	1,731	45	262	372	233	374	133	106	76	47	53	31	2,901	3,953
Not in families.....	8,432	8,406	61	544	959	902	1,872	1,008	726	904	483	561	386	3,928	5,574
Male.....	1,961	1,958	17	112	199	152	430	209	202	225	132	133	148	4,328	6,527
62 to 64 years.....	322	322	8	19	31	10	49	18	31	40	32	35	49	5,840	8,624
65 to 71 years.....	675	675	5	37	72	51	137	79	57	80	50	50	59	4,459	6,660
72 years and over.....	964	961	4	57	96	91	243	113	114	105	50	48	39	3,953	5,731
Female.....	6,471	6,448	44	432	760	750	1,442	799	524	679	351	429	238	3,859	5,284
62 to 64 years.....	791	784	17	59	63	94	71	79	93	105	61	93	51	5,112	6,500
65 to 71 years.....	2,248	2,241	12	130	238	246	458	304	169	290	142	160	92	4,118	5,522
72 years and over.....	3,431	3,422	15	243	459	410	913	417	262	284	148	175	96	3,641	4,849
WHITE															
Married Couples¹															
Total, 62 years and over ¹	8,783	8,776	40	41	76	114	451	547	738	1,440	1,108	1,787	2,434	9,635	13,183
62 to 64 years.....	2,248	2,245	16	16	23	21	60	65	112	219	208	494	1,012	13,497	16,949
65 to 71 years.....	3,520	3,520	15	10	30	43	160	176	241	603	496	790	957	9,933	13,145
72 years and over.....	3,015	3,011	10	16	23	51	231	305	385	618	405	503	465	7,448	10,420
Single, Widowed, or Divorced Persons															
Total, 62 years and over.....	10,812	10,699	126	827	1,217	1,150	2,275	1,226	943	1,088	599	716	532	3,892	5,602
In families.....	3,259	3,168	76	384	476	367	593	292	277	246	129	174	153	3,473	5,142
Male.....	684	670	24	41	80	63	107	57	68	67	34	46	82	4,332	7,141
62 to 64 years.....	163	155	7	16	15	12	14	11	17	19	8	12	25	5,200	7,756
65 to 71 years.....	247	242	6	14	27	15	48	21	29	22	11	20	28	4,542	7,759
72 years and over.....	274	273	11	12	39	37	45	25	22	26	14	14	28	3,850	6,243
Female.....	2,575	2,497	51	342	396	304	486	235	209	179	95	128	71	3,318	4,605
62 to 64 years.....	274	263	4	29	32	26	28	25	35	31	16	22	16	4,513	5,855
65 to 71 years.....	754	727	10	89	84	81	119	82	72	75	35	54	25	3,830	5,090
72 years and over.....	1,547	1,507	37	224	280	197	340	127	102	73	44	53	30	3,045	4,154
Not in families.....	7,553	7,532	51	443	741	783	1,682	935	667	843	469	541	378	4,072	5,795
Male.....	1,631	1,629	15	79	135	122	354	173	174	188	126	118	144	4,632	7,009
62 to 64 years.....	275	275	8	13	27	10	41	12	23	32	32	28	47	6,094	9,111
65 to 71 years.....	528	528	2	23	40	34	108	62	48	60	44	47	59	4,922	7,443
72 years and over.....	829	826	4	43	68	78	205	99	102	96	50	43	37	4,154	6,033
Female.....	5,922	5,903	36	364	605	661	1,327	762	493	654	343	423	234	3,968	5,461
62 to 64 years.....	713	709	12	50	49	86	60	73	79	100	59	91	49	5,315	6,771
65 to 71 years.....	2,033	2,027	12	108	182	205	415	281	162	279	135	158	90	4,326	5,727
72 years and over.....	3,175	3,167	11	206	375	370	852	408	252	275	148	174	95	3,728	4,997

See footnotes at end of table.

Table 23. Total Money Income in 1977 of Persons 62 Years and Over, by Race, Spanish Origin, Marital and Family Status, and Age—Continued

(In thousands. Couples and persons 62 years old and over as of March 1978. For meaning of symbols, see text)

In thousands. Couples and persons 62 years old and over as of March 1970. For meaning of symbols, see explanatory notes on page 1.															
Race, Spanish origin, marital status, family status, and age	Total	With income												Median income (dollars)	Mean income (dollars)
		Total	\$1 to \$999 or loss	\$1,000 to \$1,999	\$2,000 to \$2,499	\$2,500 to \$2,999	\$3,000 to \$3,999	\$4,000 to \$4,999	\$5,000 to \$5,999	\$6,000 to \$7,999	\$8,000 to \$9,999	\$10,000 to \$14,999	\$15,000 and over		
BLACK															
Married Couples ¹															
Total, 62 years and over.....	641	639	8	15	26	23	89	66	75	119	57	82	79	6,221	8,214
62 to 64 years.....	173	173	4	7	3	6	13	10	14	21	22	42	30	8,543	10,271
65 to 71 years.....	272	270	1	6	19	10	29	26	30	60	20	27	41	6,329	8,368
72 years and over.....	196	196	2	2	5	7	46	29	31	38	15	13	8	5,246	6,186
Single, Widowed, or Divorced Persons															
Total, 62 years and over.....	1,391	1,362	25	204	372	188	263	113	83	64	21	21	8	2,711	3,345
In families.....	585	560	15	105	168	77	100	42	25	13	9	6	-	2,477	2,997
Male.....	139	134	3	28	28	15	22	14	8	7	8	-	-	2,746	3,395
62 to 64 years.....	12	10	-	-	1	2	-	-	3	2	1	-	-	(B)	(B)
65 to 71 years.....	72	68	3	15	8	3	14	12	2	4	6	-	-	(B)	(B)
72 years and over.....	55	55	-	13	19	10	8	2	2	2	-	-	-	(B)	(B)
Female.....	446	426	11	77	140	62	77	28	18	6	2	6	-	2,445	2,872
62 to 64 years.....	70	62	-	12	12	13	6	3	11	1	-	3	-	(B)	(B)
65 to 71 years.....	178	169	4	34	41	20	42	19	4	3	2	3	-	2,675	3,057
72 years and over.....	199	195	8	31	88	29	29	5	3	2	-	-	-	2,335	2,457
Not in families.....	806	802	11	100	203	111	164	71	58	51	12	15	8	2,893	3,588
Male.....	298	298	2	34	55	25	64	36	28	35	5	11	3	3,516	4,137
62 to 64 years.....	47	47	-	6	3	-	8	6	8	8	-	7	2	(B)	(B)
65 to 71 years.....	135	135	2	14	26	16	26	17	9	17	5	2	-	3,354	3,867
72 years and over.....	117	117	-	14	26	9	30	13	12	9	-	2	1	3,318	3,770
Female.....	508	504	8	66	149	86	100	35	30	16	7	4	4	2,669	3,263
62 to 64 years.....	74	72	5	7	15	7	10	6	12	5	1	2	2	(B)	(B)
65 to 71 years.....	203	203	-	22	53	41	43	22	7	6	5	-	2	2,812	3,432
72 years and over.....	230	229	3	36	81	37	46	7	10	5	-	2	1	2,462	2,880
SPANISH ORIGIN ²															
Married Couples ¹															
Total, 62 years and over.....	231	229	3	4	9	9	32	22	25	37	35	26	29	6,495	8,378
62 to 64 years.....	53	52	1	2	1	3	2	6	3	7	7	7	14	(B)	(B)
65 to 71 years.....	110	110	2	1	4	3	18	8	9	18	19	14	14	6,933	8,757
72 years and over.....	68	67	-	1	5	2	12	8	13	12	9	5	1	(B)	(B)
Single, Widowed, or Divorced Persons															
Total, 62 years and over.....	301	278	8	38	81	30	60	17	14	15	5	5	5	2,704	3,557
In families.....	158	137	5	25	46	9	26	8	7	8	3	-	-	2,419	3,031
Male.....	28	28	-	3	5	1	5	1	5	6	2	-	-	(B)	(B)
62 to 64 years.....	8	8	-	-	-	-	2	-	3	2	1	-	-	(B)	(B)
65 to 71 years.....	11	11	-	-	3	1	1	1	1	2	1	-	-	(B)	(B)
72 years and over.....	9	9	-	2	2	-	2	-	1	2	-	-	-	(B)	(B)
Female.....	130	109	5	22	41	8	21	6	3	2	1	-	-	2,334	2,649
62 to 64 years.....	20	14	-	5	2	-	1	2	2	2	-	-	-	(B)	(B)
65 to 71 years.....	42	37	2	3	18	4	7	2	1	1	-	-	-	(B)	(B)
72 years and over.....	68	58	3	13	21	4	13	2	1	1	2	5	5	2,966	4,068
Not in families.....	143	141	3	13	35	21	35	10	7	6	2	1	1	(B)	(B)
Male.....	49	48	2	2	15	4	12	4	2	2	1	2	1	(B)	(B)
62 to 64 years.....	5	5	-	1	-	-	2	-	-	1	-	1	-	(B)	(B)
65 to 71 years.....	15	15	-	1	3	3	5	2	-	-	-	1	1	(B)	(B)
72 years and over.....	28	27	2	1	12	2	5	2	2	1	1	-	-	(B)	(B)
Female.....	94	93	1	10	19	17	22	5	5	5	1	3	4	2,965	4,187
62 to 64 years.....	15	15	-	3	1	3	1	1	3	2	-	-	-	(B)	(B)
65 to 71 years.....	37	36	1	2	9	7	7	4	2	2	1	-	2	(B)	(B)
72 years and over.....	43	42	-	5	9	7	14	-	1	1	-	3	2	(B)	(B)

¹Income of couples with at least one member 62 years old or over; if both members 62 and over, age category determined by age of head.

²Persons of Spanish origin may be of any race.

Source: U.S. Department of Commerce, Bureau of the Census, unpublished data from the 1978 Current Population Survey.

Table 24. Total Money Income in 1977 of Persons 65 Years and Over, by Race, Spanish Origin, and Marital Status

(In thousands. Persons 65 years and over as of March 1978. For meaning of symbols, see text)

Race, Spanish origin, and total money income	Male						Female						
	Total	Single	Married		Widowed	Divorced	Total	Single	Married		Widowed	Divorced	
			Total	Wife present					Total	Husband present			
ALL RACES													
Total.....	9,170	495	7,107	6,859	1,300	269	13,298	828	5,130	4,885	6,917	423	7
Without income.....	25	7	11	11	7	-	976	14	871	868	85	7	7
With income.....	9,145	488	7,096	6,848	1,293	269	12,322	814	4,259	4,017	6,832	416	2
\$1 to \$999 or loss.....	87	11	61	57	15	-	417	9	339	331	67	2	2
\$1,000 to \$1,499.....	173	14	116	104	39	4	1,062	38	785	754	217	22	22
\$1,500 to \$1,999.....	244	22	174	157	36	12	1,489	40	1,057	1,039	363	29	29
\$2,000 to \$2,499.....	591	67	383	324	116	24	1,686	99	528	488	1,000	58	58
\$2,500 to \$2,999.....	510	55	310	300	131	13	1,286	45	338	294	858	46	46
\$3,000 to \$3,499.....	706	60	458	431	150	37	1,252	70	229	211	909	44	44
\$3,500 to \$3,999.....	696	39	486	475	143	29	1,033	51	184	160	759	39	39
\$4,000 to \$4,999.....	1,066	58	840	814	139	28	1,139	78	193	177	814	53	53
\$5,000 to \$5,999.....	950	40	746	723	136	28	772	67	177	158	493	35	35
\$6,000 to \$6,999.....	793	11	661	653	89	32	515	40	105	100	346	24	24
\$7,000 to \$7,999.....	597	27	502	496	52	16	394	56	87	83	233	19	19
\$8,000 to \$8,999.....	431	8	377	367	41	5	275	53	59	53	155	8	8
\$9,000 to \$9,999.....	339	14	281	270	36	7	194	23	46	42	119	6	6
\$10,000 to \$11,999.....	518	13	461	453	36	7	245	36	43	40	148	19	19
\$12,000 to \$14,999.....	429	17	365	362	42	6	269	55	34	29	172	8	8
\$15,000 to \$19,999.....	450	16	390	383	37	6	165	35	25	23	104	2	2
\$20,000 to \$24,999.....	199	7	171	171	21	2	63	8	10	10	43	1	1
\$25,000 and over.....	366	10	312	306	33	11	64	12	19	17	32	1	1
Median income.....dollars..	5,526	3,689	5,962	6,059	4,112	4,532	3,088	4,716	1,975	1,944	3,502	3,585	3,585
Mean income.....dollars..	8,035	5,641	8,562	8,680	6,272	6,958	4,234	6,492	3,075	3,008	4,668	4,539	4,539
WHITE													
Total.....	8,249	428	6,525	6,371	1,083	213	12,067	784	4,739	4,558	6,178	367	367
Without income.....	18	3	9	9	6	-	890	11	810	808	64	4	4
With income.....	8,232	425	6,516	6,362	1,077	213	11,177	773	3,928	3,749	6,114	362	362
\$1 to \$999 or loss.....	65	9	40	40	15	-	356	9	291	285	55	1	1
\$1,000 to \$1,499.....	108	11	79	77	14	4	934	36	707	681	174	17	17
\$1,500 to \$1,999.....	183	22	131	123	22	7	1,353	34	991	978	305	23	23
\$2,000 to \$2,499.....	451	45	309	277	81	16	1,385	85	485	464	768	47	47
\$2,500 to \$2,999.....	431	45	278	268	97	12	1,135	43	308	282	749	34	34
\$3,000 to \$3,499.....	603	53	398	383	119	34	1,137	67	207	196	822	41	41
\$3,500 to \$3,999.....	613	35	436	428	123	18	941	48	173	157	685	36	36
\$4,000 to \$4,999.....	965	50	770	758	120	25	1,067	72	181	169	771	44	44
\$5,000 to \$5,999.....	863	40	680	661	119	24	742	62	173	154	475	32	32
\$6,000 to \$6,999.....	740	11	627	623	83	20	503	38	101	98	339	24	24
\$7,000 to \$7,999.....	563	22	480	475	50	10	374	56	81	77	218	18	18
\$8,000 to \$8,999.....	410	8	359	349	38	5	268	53	57	52	151	8	8
\$9,000 to \$9,999.....	323	13	269	264	34	7	187	23	44	40	114	6	6
\$10,000 to \$11,999.....	503	13	450	442	34	6	240	36	43	40	143	19	19
\$12,000 to \$14,999.....	417	17	357	354	39	5	265	55	32	27	171	8	8
\$15,000 to \$19,999.....	437	16	379	372	35	6	164	35	25	23	102	2	2
\$20,000 to \$24,999.....	194	7	165	165	21	2	61	8	10	10	42	1	1
\$25,000 and over.....	362	10	309	303	33	11	64	12	19	17	32	1	1
Median income.....dollars..	5,808	3,902	6,219	6,266	4,558	4,618	3,187	4,879	1,987	1,964	3,635	3,752	3,752
Mean income.....dollars..	8,444	5,987	8,902	8,961	6,821	7,540	4,375	6,666	3,144	3,069	4,853	4,767	4,767

See footnotes at end of table.

Table 24. Total Money Income in 1977 of Persons 65 Years and Over, by Race, Spanish Origin, and Marital Status—Continued

(In thousands. Persons 65 years and over as of March 1978. For meaning of symbols, see text)

Race, Spanish origin, and total money income	Male						Female					
	Total	Single	Married		Widowed	Divorced	Total	Single	Married		Widowed	Divorced
			Total	Wife present					Total	Husband present		
BLACK												
Total.....	819	56	531	441	185	48	1,111	43	361	301	652	55
Without income.....	4	4	-	-	-	-	66	2	54	53	8	3
With income.....	815	52	531	441	185	48	1,045	41	306	248	644	52
\$1 to \$999 or loss.....	22	1	21	17	-	-	55	-	42	40	12	1
\$1,000 to \$1,499.....	54	4	35	25	15	-	118	2	74	69	37	5
\$1,500 to \$1,999.....	59	-	41	33	14	4	131	6	60	56	58	6
\$2,000 to \$2,499.....	123	17	73	45	32	2	286	14	43	24	219	11
\$2,500 to \$2,999.....	68	10	30	30	27	1	139	1	28	11	97	12
\$3,000 to \$3,499.....	87	6	52	44	26	3	107	3	18	13	84	3
\$3,500 to \$3,999.....	77	2	44	42	19	11	76	3	11	10	58	3
\$4,000 to \$4,999.....	92	8	62	48	19	3	62	6	12	9	35	9
\$5,000 to \$5,999.....	82	-	61	57	16	5	29	6	4	4	18	2
\$6,000 to \$6,999.....	50	-	33	29	6	11	8	1	3	2	3	-
\$7,000 to \$7,999.....	27	3	17	16	2	5	16	-	6	6	10	-
\$8,000 to \$8,999.....	19	-	16	16	3	-	5	-	1	1	4	-
\$9,000 to \$9,999.....	14	1	12	6	1	-	3	-	-	-	3	-
\$10,000 to \$11,999.....	12	-	9	9	2	1	3	-	-	-	3	-
\$12,000 to \$14,999.....	9	-	8	8	-	1	3	-	2	2	2	-
\$15,000 to \$19,999.....	12	-	11	11	1	-	1	-	-	-	1	-
\$20,000 to \$24,999.....	5	-	5	5	-	-	2	-	-	-	2	-
\$25,000 and over.....	3	-	3	3	-	-	-	-	-	-	-	-
Median income.....dollars..	3,460	(B)	3,676	3,821	3,080	(B)	2,381	(B)	1,792	1,630	2,492	(B)
Mean income.....dollars..	4,313	(B)	4,636	4,887	3,527	(B)	2,757	(B)	2,201	2,123	2,983	(B)
SPANISH ORIGIN¹												
Total.....	232	12	181	169	29	10	286	21	109	96	140	16
Without income.....	4	-	2	2	1	-	29	1	13	13	15	-
With income.....	229	12	178	166	28	10	257	20	96	83	124	16
\$1 to \$999 or loss.....	5	-	3	3	2	-	14	-	9	8	5	-
\$1,000 to \$1,499.....	7	-	5	5	1	-	31	-	24	21	7	1
\$1,500 to \$1,999.....	14	-	12	12	2	-	41	1	29	27	11	-
\$2,000 to \$2,499.....	26	3	32	25	6	5	67	7	12	10	42	6
\$2,500 to \$2,999.....	21	2	15	15	3	-	25	1	5	3	18	2
\$3,000 to \$3,499.....	24	2	17	17	4	-	28	1	9	7	15	3
\$3,500 to \$3,999.....	18	2	12	11	3	1	21	3	3	2	15	1
\$4,000 to \$4,999.....	21	1	17	16	1	2	11	2	4	3	5	-
\$5,000 to \$5,999.....	18	-	14	14	3	-	5	-	1	1	2	2
\$6,000 to \$6,999.....	14	-	13	12	-	1	2	-	-	-	2	-
\$7,000 to \$7,999.....	8	1	6	6	2	-	2	-	1	-	1	-
\$8,000 to \$8,999.....	8	-	7	6	1	-	-	-	-	-	-	-
\$9,000 to \$9,999.....	7	-	7	7	-	-	2	-	-	-	2	-
\$10,000 to \$11,999.....	7	1	6	6	-	-	1	-	-	-	1	-
\$12,000 to \$14,999.....	3	-	3	3	-	-	2	2	-	-	-	1
\$15,000 to \$19,999.....	3	-	3	3	-	-	3	2	1	1	-	-
\$20,000 to \$24,999.....	2	1	1	1	-	-	2	2	-	-	-	-
\$25,000 and over.....	2	-	2	2	-	-	-	-	-	-	-	-
Median income.....dollars..	3,454	(B)	3,604	3,713	(B)	(B)	2,313	(B)	1,776	1,728	2,468	(B)
Mean income.....dollars..	4,881	(B)	5,158	5,276	(B)	(B)	2,907	(B)	2,121	2,041	2,820	(B)

¹Persons of Spanish origin may be of any race.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, No. 118.

Table 25. Total Money Income in 1977 of Families With Heads 65 Years and Over, by Type of Family and Race of Head and Total Money Income of Unrelated Individuals 65 Years and Over, by Race

(In thousands. Families and unrelated individuals as of March 1978. For meaning of symbols, see text)

Race and money income	Families							Unrelated individuals	
	Total	Male head					Female head	Male	Female
		Total	Married, wife present			Other marital status			
			Total	Wife in paid labor force	Wife not in paid labor force				
ALL RACES									
Total.....	8,212	7,048	6,781	1,068	5,713	267	1,164	1,639	5,680
Under \$2,000.....	93	68	58	4	54	10	25	104	416
\$2,000 to \$2,999.....	213	160	143	11	132	17	52	311	1,352
\$3,000 to \$3,999.....	496	411	406	16	390	6	85	380	1,371
\$4,000 to \$4,999.....	599	479	460	24	436	18	120	191	721
\$5,000 to \$5,999.....	720	625	614	48	566	12	94	171	431
\$6,000 to \$6,999.....	728	659	643	56	587	16	69	107	329
\$7,000 to \$7,999.....	654	574	547	42	505	28	79	78	245
\$8,000 to \$8,999.....	552	478	474	75	399	4	74	49	175
\$9,000 to \$9,999.....	473	442	423	79	345	18	31	51	115
\$10,000 to \$11,999.....	739	654	637	104	533	17	84	50	166
\$12,000 to \$14,999.....	862	717	697	147	549	22	143	47	169
\$15,000 to \$19,999.....	842	694	665	182	483	31	147	44	109
\$20,000 to \$24,999.....	485	423	400	122	277	24	61	15	45
\$25,000 and over.....	759	661	616	157	459	46	97	40	34
Median income.....dollars..	9,110	9,156	9,108	13,406	8,468	10,376	8,777	4,123	3,762
Mean income.....dollars..	12,482	12,604	12,524	16,520	11,777	14,643	11,743	6,105	5,101
WHITE									
Total.....	7,463	6,530	6,309	940	5,368	221	933	1,357	5,209
Under \$2,000.....	69	48	47	2	45	1	21	74	353
\$2,000 to \$2,999.....	142	121	114	6	108	7	21	220	1,132
\$3,000 to \$3,999.....	391	344	339	13	326	6	46	313	1,268
\$4,000 to \$4,999.....	506	430	417	22	395	12	76	161	689
\$5,000 to \$5,999.....	639	565	556	31	525	9	74	150	414
\$6,000 to \$6,999.....	665	616	603	51	551	13	49	88	320
\$7,000 to \$7,999.....	602	531	508	33	475	22	72	69	234
\$8,000 to \$8,999.....	513	449	445	60	385	4	64	46	172
\$9,000 to \$9,999.....	447	419	402	73	329	18	28	49	112
\$10,000 to \$11,999.....	700	628	613	97	515	16	72	47	164
\$12,000 to \$14,999.....	815	685	668	138	531	17	129	43	167
\$15,000 to \$19,999.....	787	654	626	159	467	29	133	42	108
\$20,000 to \$24,999.....	466	409	386	113	273	24	57	15	43
\$25,000 and over.....	721	632	586	142	444	45	90	40	34
Median income.....dollars..	9,458	9,386	9,313	13,649	8,672	12,554	10,370	4,441	3,872
Mean income.....dollars..	12,889	12,900	12,778	16,985	12,041	16,384	12,814	6,570	5,267
BLACK									
Total.....	679	464	431	109	322	34	214	251	433
Under \$2,000.....	16	13	10	2	8	2	4	30	63
\$2,000 to \$2,999.....	63	36	29	5	24	7	27	76	213
\$3,000 to \$3,999.....	97	62	62	3	59	-	35	57	89
\$4,000 to \$4,999.....	88	49	42	2	40	6	39	30	29
\$5,000 to \$5,999.....	71	52	49	13	37	3	19	20	18
\$6,000 to \$6,999.....	62	41	39	5	34	3	20	19	4
\$7,000 to \$7,999.....	48	40	37	9	28	3	8	7	7
\$8,000 to \$8,999.....	33	24	24	11	13	-	10	3	3
\$9,000 to \$9,999.....	26	23	22	6	16	1	3	2	3
\$10,000 to \$11,999.....	37	24	22	6	17	1	12	3	-
\$12,000 to \$14,999.....	41	28	23	7	16	5	12	1	2
\$15,000 to \$19,999.....	49	35	33	19	14	2	14	1	1
\$20,000 to \$24,999.....	16	12	12	9	4	-	4	-	2
\$25,000 and over.....	32	25	25	12	13	-	7	-	-
Median income.....dollars..	6,066	6,497	6,573	9,937	5,790	(B)	5,120	3,317	2,621
Mean income.....dollars..	8,363	8,752	8,880	12,840	7,541	(B)	7,519	3,822	3,130

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, No. 118.

Table 26. Total Family Income in 1977 of Family Members 55 Years and Over, by Race, Sex, Age, and Relationship to Family Head

(In thousands. Family members as of March 1978. For meaning of symbols, see text)

Total family income														Median family income (dollars)
Race, sex, age and relationship to family head	Total	Under \$2,000	\$2,000 to \$2,999	\$3,000 to \$4,999	\$5,000 to \$6,999	\$7,000 to \$9,999	\$10,000 to \$11,999	\$12,000 to \$14,999	\$15,000 to \$16,999	\$17,000 to \$19,999	\$20,000 to \$24,999	\$25,000 and over		
ALL RACES														
Male														
Total, 55 years and over...	16,232	187	253	1,258	1,827	2,381	1,268	1,762	951	1,305	1,710	3,329	13,438	
Head of family.....	15,399	175	250	1,204	1,746	2,266	1,214	1,671	900	1,231	1,627	3,113	13,348	
Relative of head.....	834	10	2	55	83	115	55	90	50	75	83	214	15,178	
55 to 59 years.....	4,693	52	34	151	194	346	282	513	344	485	720	1,572	19,607	
Head of family.....	4,520	46	34	137	177	325	267	491	335	472	698	1,538	19,823	
Relative of head.....	174	5	-	15	18	21	16	21	9	13	22	34	13,575	
60 and 61 years.....	1,616	24	10	60	93	177	106	189	121	154	245	438	17,470	
Head of family.....	1,571	22	9	60	87	171	100	183	112	152	243	432	17,698	
Relative of head.....	44	1	-	-	6	6	6	6	9	2	2	5	(B)	
62 to 64 years.....	2,392	39	47	126	209	293	198	287	158	233	276	525	14,946	
Head of family.....	2,260	39	47	117	198	276	193	279	148	218	263	482	14,753	
Relative of head.....	132	-	-	9	12	17	5	8	9	15	14	42	17,942	
65 years and over.....	7,531	72	162	921	1,331	1,565	682	773	328	433	469	794	9,271	
Head of family.....	7,048	68	160	890	1,284	1,494	654	718	305	389	423	661	9,023	
Relative of head.....	484	4	2	31	47	71	28	55	23	45	45	133	15,355	
Female														
Total, 55 years and over...	16,239	203	319	1,479	1,983	2,495	1,354	1,783	959	1,204	1,528	2,935	12,400	
Head of family.....	2,117	55	104	316	279	334	175	250	141	168	134	162	9,659	
Wife of head.....	11,997	126	192	1,069	1,550	1,909	1,008	1,306	690	844	1,158	2,149	12,274	
Other relative of head.....	2,124	21	23	93	154	250	171	229	129	194	234	623	16,810	
55 to 59 years.....	4,865	84	100	258	277	500	336	532	369	459	655	1,297	16,865	
Head of family.....	574	23	31	71	61	92	55	69	35	48	48	42	10,304	
Wife of head.....	4,058	51	64	176	201	381	257	436	324	391	580	1,197	17,944	
Other relative.....	233	10	4	11	15	26	23	28	10	21	27	57	14,810	
60 and 61 years.....	1,607	18	20	98	163	236	139	192	107	130	181	322	13,853	
Head of family.....	170	2	6	15	25	21	14	23	23	13	15	13	12,127	
Wife of head.....	1,327	15	14	80	130	194	118	158	78	106	159	277	14,020	
Other relative.....	109	-	1	3	8	21	8	11	7	11	6	33	15,551	
62 to 64 years.....	2,149	17	40	168	234	342	241	277	133	158	203	337	12,289	
Head of family.....	209	5	15	26	29	36	21	14	18	24	10	10	9,267	
Wife of head.....	1,788	9	25	136	199	288	205	240	107	122	176	283	12,327	
Other relative.....	152	3	-	6	6	17	15	23	8	12	17	44	16,263	
65 years and over.....	7,618	84	159	955	1,309	1,417	638	782	350	457	489	979	9,670	
Head of family.....	1,164	25	52	204	164	185	85	144	65	83	61	97	9,021	
Wife of head.....	4,824	51	89	677	1,020	1,046	428	472	181	225	243	392	8,354	
Other relative.....	1,630	8	18	73	125	186	125	167	104	150	184	489	17,147	
WHITE														
Male														
Total, 55 years and over...	14,879	150	196	1,058	1,631	2,155	1,146	1,628	898	1,226	1,615	3,177	13,888	
Head of family.....	14,203	141	194	1,028	1,574	2,065	1,105	1,558	849	1,158	1,542	2,986	13,754	
Relative of head.....	676	9	2	29	56	89	40	70	49	66	72	191	16,591	
55 to 59 years.....	4,323	47	28	120	153	299	241	474	324	457	674	1,507	20,105	
Head of family.....	4,170	41	28	106	142	279	230	459	315	444	652	1,473	20,233	
Relative of head.....	153	5	-	13	11	20	11	15	9	13	22	34	15,099	
60 and 61 years.....	1,473	22	8	48	80	144	89	164	112	150	235	420	18,232	
Head of family.....	1,434	21	8	48	74	139	85	159	104	148	233	415	18,452	
Relative of head.....	39	1	-	-	6	4	4	5	8	2	2	5	(B)	
62 to 64 years.....	2,191	31	37	109	190	264	167	262	150	215	260	506	15,419	
Head of family.....	2,069	31	37	100	178	248	162	255	141	201	248	466	15,278	
Relative of head.....	122	-	-	9	11	16	5	7	9	13	11	40	17,736	
65 years and over.....	6,892	50	123	781	1,208	1,448	649	728	312	404	446	744	9,535	
Head of family.....	6,530	48	121	774	1,180	1,399	628	685	289	365	409	632	9,262	
Relative of head.....	362	3	2	7	28	49	20	43	23	38	37	112	17,444	
Female														
Total, 55 years and over...	14,662	158	213	1,179	1,743	2,261	1,228	1,666	889	1,119	1,439	2,771	12,846	
Head of family.....	1,663	36	43	184	198	286	149	217	124	150	121	152	11,004	
Wife of head.....	11,179	104	156	929	1,419	1,766	932	1,242	651	800	1,113	2,068	12,580	
Other relative.....	1,820	18	13	65	124	210	148	207	114	168	203	550	17,166	
55 to 59 years.....	4,409	69	68	196	230	429	291	500	342	431	614	1,241	17,478	
Head of family.....	441	11	13	37	40	76	50	58	29	44	41	41	11,680	
Wife of head.....	3,779	48	54	151	179	330	226	416	305	369	550	1,151	18,331	
Other relative.....	189	10	1	8	10	23	15	27	8	18	22	48	15,567	
60 and 61 years.....	1,454	8	15	84	143	213	125	180	93	120	175	299	14,190	
Head of family.....	128	-	2	10	15	16	13	18	17	11	14	11	12,991	
Wife of head.....	1,235	8	11	72	120	177	107	154	70	98	154	264	14,272	
Other relative.....	91	-	1	1	8	20	6	7	7	10	6	24	15,427	
62 to 64 years.....	1,941	13	19	142	201	301	220	253	125	153	196	319	12,739	
Head of family.....	161	4	7	14	20	30	14	12	16	24	9	10	10,742	
Wife of head.....	1,658	7	12	122	178	260	192	223	103	118	170	273	12,645	
Other relative.....	122	2	-	6	3	11	14	18	5	10	16	36	17,454	
65 years and over.....	6,858	68	111	757	1,169	1,318	592	733	329	415	454	912	10,017	
Head of family.....	933	21	21	123	123	164	72	129	62	71	57	90	10,356	
Wife of head.....	4,507	41	79	584	942	999	407	449	173	215	239	380	8,534	
Other relative.....	1,418	6	11	50	103	156	113	155	94	130	159	442	17,429	

Table 26. Total Family Income in 1977 of Family Members 55 Years and Over, by Race, Sex, Age, and Relationship to Family Head—Continued

(In thousands. Family members as of March 1978. For meaning of symbols, see text)

Race, sex, age and relationship to family head	Total	Total family income											Median family income
		Under \$2,000	\$2,000 to \$2,999	\$3,000 to \$4,999	\$5,000 to \$6,999	\$7,000 to \$9,999	\$10,000 to \$11,999	\$12,000 to \$14,999	\$15,000 to \$16,999	\$17,000 to \$19,999	\$20,000 to \$24,999	\$25,000 and over	(dollars)
BLACK													
Male													
Total, 55 years and over....	1,162	25	52	182	181	212	110	115	44	67	71	102	8,733
Head of family.....	1,032	25	52	156	157	187	97	96	43	60	67	90	8,742
Relative of head.....	130	-	-	25	26	26	12	19	1	7	4	11	8,451
55 to 59 years.....	307	3	4	28	40	45	39	29	15	24	36	43	11,667
Head of family.....	289	3	4	26	35	45	34	24	15	24	36	43	11,843
Relative of head.....	18	-	-	1	6	1	4	6	-	-	-	-	(B)
60 and 61 years.....	117	1	2	6	10	32	16	22	8	2	7	11	10,938
Head of family.....	112	1	2	6	10	30	14	21	7	2	7	11	11,000
Relative of head.....	5	-	-	-	-	2	2	1	1	-	-	-	(B)
62 to 64 years.....	170	8	10	14	18	27	25	23	7	14	12	12	10,549
Head of family.....	167	8	10	13	18	26	25	23	7	13	12	12	10,554
Relative of head.....	3	-	-	-	1	1	-	-	-	1	-	-	(B)
65 years and over.....	568	13	36	134	113	108	30	41	14	27	16	36	6,720
Head of family.....	464	13	36	111	94	86	24	28	14	21	12	25	6,421
Relative of head.....	104	-	-	24	19	22	6	12	-	6	4	11	7,974
Female													
Total, 55 years and over....	1,394	43	102	277	223	221	115	101	62	73	64	113	7,533
Head of family.....	428	19	57	122	75	49	26	27	17	17	11	10	5,360
Wife of head.....	724	21	36	127	118	132	69	56	37	35	34	61	8,142
Other relative of head.....	241	4	10	28	30	39	19	16	8	20	18	44	10,658
55 to 59 years.....	398	15	31	55	44	68	40	28	24	26	30	38	9,217
Head of family.....	127	12	18	31	18	16	5	10	6	4	5	1	5,194
Wife of head.....	237	3	10	20	20	48	30	16	18	19	22	32	11,086
Other relative of head.....	34	-	3	4	6	4	4	1	-	3	3	6	(B)
60 and 61 years.....	131	9	5	11	16	21	14	12	13	10	5	14	10,389
Head of family.....	41	2	4	5	10	5	1	4	6	2	1	2	(B)
Wife of head.....	76	7	2	5	6	14	11	3	7	7	4	9	10,530
Other relative of head.....	14	-	-	1	-	1	2	4	-	1	-	4	(B)
62 to 64 years.....	187	4	21	25	28	40	18	20	7	6	6	12	7,861
Head of family.....	46	1	8	12	8	7	7	1	2	-	1	-	(B)
Wife of head.....	116	2	13	13	17	27	10	15	4	4	3	8	8,148
Other relative of head.....	25	1	-	-	3	6	1	4	1	2	1	4	(B)
65 years and over.....	678	15	45	186	135	92	43	41	18	31	23	49	6,215
Head of family.....	214	4	27	74	39	21	13	12	3	11	4	7	5,081
Wife of head.....	295	9	11	89	75	43	18	22	8	5	5	12	5,832
Other relative of head.....	168	3	7	23	21	28	12	7	7	14	14	30	10,265

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, No. 118.

Table 27. Source of Income in 1977 of Families With Head 65 Years and Over and Unrelated Individuals 65 Years and Over

(In thousands. Families and unrelated individuals as of March 1978. For meaning of symbols, see text)

Total money income	Total with income	With earnings only	With earnings and other income	Other income only							Reported no money income	
				Total	Social Security income only	Public assistance income only	Social Security and property income only	Social Security and pension income only	Social Security, Pension, and property income only	All other combinations		
FAMILIES												
Total.....	8,206	89	3,868	4,248	585	3	1,036	364	1,290	969	6	
Under \$2,000.....	87	8	36	43	26	-	4	-	3	10	6	
\$2,000 to \$2,999.....	213	2	54	156	55	-	28	-	1	72	-	
\$3,000 to \$3,999.....	496	1	80	415	154	3	61	9	4	184	-	
\$4,000 to \$4,999.....	599	2	141	455	155	-	128	24	17	132	-	
\$5,000 to \$5,999.....	720	-	204	516	109	-	181	49	47	130	-	
\$6,000 to \$6,999.....	728	2	200	525	33	-	140	75	144	133	-	
\$7,000 to \$7,999.....	654	1	219	434	25	-	142	81	125	61	-	
\$8,000 to \$8,999.....	552	4	235	313	14	-	83	39	134	44	-	
\$9,000 to \$9,999.....	473	4	221	249	9	-	56	30	117	38	-	
\$10,000 to \$11,999.....	739	4	385	349	4	-	79	26	197	43	-	
\$12,000 to \$14,999.....	862	14	531	317	2	-	53	21	202	38	-	
\$15,000 to \$19,999.....	842	17	603	223	-	-	35	10	143	36	-	
\$20,000 to \$24,999.....	485	13	368	103	-	-	12	-	72	19	-	
\$25,000 and over.....	759	17	591	151	-	-	34	-	83	33	-	
Median income.....dollars..	9,114	15,304	12,810	7,033	4,370	(B)	6,823	7,311	10,471	5,696	(B)	
Median income.....dollars..	12,490	17,484	16,129	9,073	4,578	(B)	8,609	7,792	12,863	7,742	(B)	
UNRELATED INDIVIDUALS												
Total.....	7,300	68	1,205	6,027	1,237	29	1,823	343	952	1,643	19	
Under \$2,000.....	503	10	48	446	196	15	95	4	4	131	19	
\$2,000 to \$2,999.....	1,663	11	109	1,543	544	11	342	33	5	608	-	
\$3,000 to \$3,999.....	1,752	7	163	1,583	426	3	482	104	79	488	-	
\$4,000 to \$4,999.....	912	4	173	735	55	-	340	68	133	139	-	
\$5,000 to \$5,999.....	602	2	126	474	10	-	155	52	162	94	-	
\$6,000 to \$6,999.....	436	11	124	301	3	-	99	32	125	42	-	
\$7,000 to \$7,999.....	323	2	82	240	-	-	84	27	98	31	-	
\$8,000 to \$8,999.....	224	1	72	152	-	-	53	8	71	19	-	
\$9,000 to \$9,999.....	166	3	37	126	1	-	40	4	59	21	-	
\$10,000 to \$11,999.....	216	5	65	146	-	-	38	4	76	27	-	
\$12,000 to \$14,999.....	217	4	77	136	-	-	40	5	69	23	-	
\$15,000 to \$19,999.....	153	5	67	81	-	-	26	2	41	12	-	
\$20,000 to \$24,999.....	59	2	18	40	-	-	21	-	17	2	-	
\$25,000 and over.....	74	1	45	28	-	-	7	-	15	6	-	
Median income.....dollars..	3,834	(B)	5,872	3,604	2,768	(B)	3,984	4,452	6,754	3,167	(B)	
Median income.....dollars..	5,340	(B)	8,133	4,763	2,755	(B)	5,079	4,923	8,261	3,918	(B)	

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Poverty Status of Persons and Families

About 1 out of every 7 persons 65 years and over in 1977, or 3.2 million persons, lived in families or as unrelated individuals with low enough incomes to place them below the poverty level. Although the total number of poor people in the United States has not changed much since 1970, the number of elderly poor (those 65 years and over) dropped by about 1.5 million, or from one-fourth of the age group in 1970 to about one-seventh in 1977. One out of every 5 poor persons was Black in 1977.

About the same number of older poor persons (1.6 million) lived in metropolitan as in nonmetropolitan areas, although a higher proportion of older persons in nonmetropolitan areas were poor in 1977. Relatively few (8 percent) of the older poor worked in 1977.

A little more than one-half of the older poor people lived alone and about 37 percent were part of a family; the remainder lived with nonrelatives. Approximately 710,000 families maintained by persons 65 years and over, or 9 percent of all families maintained by persons of this age, were below the poverty level in 1977. About 9 percent of families maintained by a man and 14 percent maintained by a woman fell below the poverty level. Black families were about 5 times as likely to be poor as White families.

The number and kinds of income sources reported were closely associated with whether a family's income fell below the poverty level in 1977. Not surprisingly, the lowest

incidence of family poverty among the elderly occurred where the family had earnings along with other sources of income; only about 4 percent of these families were poor in 1977.

Families without earnings income and families whose major source of income was Social Security, either as their only income source or in conjunction with Supplemental Security income, had a high incidence of poverty. About 31 percent of families with Social Security income only, and 49 percent of those with Social Security and Supplemental Security incomes, were below the poverty level in 1977.

The incidence of poverty varies significantly between race and sex groups. In 1977, poor older Whites outnumbered poor older Blacks in the ratio of 3 to 1, but the proportions among the two groups were reversed; thus, 36 percent of Blacks and 12 percent of Whites were poor. One-half of all Blacks living outside of families were poor in 1977; of those living within families, about one-fourth were poor. Among Whites, the corresponding figures were 20 percent for those outside families and 6 percent for those in families. The contrast between race and sex groups is particularly striking when all older White men are compared with all older Black women. In 1977, 41 percent of Black women 65 years and over lived in poverty, while only 8 percent of White men of this age group were poor.

Table 28. Poverty Status in 1977 of Persons 60 Years and Over, by Age and Selected Characteristics

(In thousands. Persons as of March 1978. For meaning of symbols, see text)

In thousands. Persons as of March 1978. For meaning of symbols, see text.												
Subject	All income levels						Below poverty level					
	Total, 60 years and over	60 and 61 years	62 to 64 years	65 years and over			Total, 60 years and over	60 and 61 years	62 to 64 years	65 years and over		
				Total	65 to 71 years	72 years and over				Total	65 to 71 years	72 years and over
ALL RACES												
Family Status and Composition												
Total.....	31,946	3,824	5,654	22,468	10,844	11,624	4,123	332	614	3,177	1,287	1,890
In families.....	22,913	3,222	4,541	15,150	7,921	7,229	1,647	174	297	1,176	553	622
Head.....	12,422	1,741	2,469	8,212	4,261	3,950	1,003	97	197	710	310	400
Wife of head.....	7,940	1,327	1,788	4,824	2,965	1,860	529	70	95	364	204	160
Other family members.....	2,551	153	284	2,114	694	1,419	114	7	5	102	39	62
In subfamilies.....	200	4	44	151	55	96	57	2	19	35	17	19
Unrelated individuals.....	9,033	602	1,113	7,319	2,923	4,395	2,476	158	317	2,001	733	1,268
Living alone.....	8,326	551	974	6,801	2,656	4,145	2,235	143	265	1,827	641	1,187
Living with nonrelatives.....	707	51	139	517	267	250	241	15	52	174	93	81
In households.....	613	45	119	448	228	221	207	13	51	143	75	68
Type of Residence												
Total.....	31,946	3,824	5,654	22,468	10,844	11,624	4,123	332	614	3,177	1,287	1,890
Metropolitan areas.....	20,124	2,494	3,630	14,000	6,854	7,146	2,086	184	309	1,593	691	902
In central cities.....	9,431	1,086	1,646	6,699	3,255	3,443	1,242	127	161	953	436	517
Outside central cities.....	10,693	1,409	1,984	7,301	3,599	3,703	844	57	148	639	254	385
Nonmetropolitan areas.....	11,822	1,330	2,024	8,468	3,990	4,478	2,037	148	305	1,584	596	988
Work Experience												
Total.....	31,946	3,824	5,654	22,468	10,844	11,624	4,123	332	614	3,177	1,287	1,890
Worked last year.....	9,234	2,358	2,824	4,052	2,895	1,157	513	116	150	248	161	87
50 to 52 weeks.....	5,510	1,742	1,828	1,940	1,359	581	244	62	71	111	65	46
49 weeks or less.....	3,724	616	996	2,112	1,536	576	269	54	79	137	96	41
Did not work last year.....	22,712	1,466	2,830	18,417	7,949	10,467	3,610	216	465	2,929	1,126	1,803
Retired.....	9,510	216	808	8,485	3,550	4,935	1,073	22	99	951	350	601
Tenure and Living Arrangements												
Persons in households.....	31,946	3,824	5,654	22,468	10,844	11,624	4,123	332	614	3,177	1,287	1,890
Living with relatives.....	23,078	3,227	4,583	15,268	7,995	7,273	1,719	173	314	1,231	590	641
Owner-occupied units.....	19,148	2,747	3,852	12,550	6,661	5,889	1,184	116	220	847	387	461
Renter-occupied units.....	3,930	480	732	2,718	1,334	1,384	535	57	94	383	203	180
Public.....	237	26	43	168	80	88	64	5	9	50	25	25
Private.....	3,692	454	689	2,550	1,254	1,295	471	52	86	334	179	155
Living with nonrelatives only.....	542	47	96	399	193	206	169	15	35	119	56	63
Owner-occupied units.....	353	31	62	260	118	141	91	8	18	66	31	35
Renter-occupied units.....	190	16	34	140	75	65	78	8	17	53	25	28
Public.....	-	-	-	-	-	-	-	-	-	-	-	-
Private.....	190	16	34	140	75	65	78	8	17	53	25	28
Living alone.....	8,326	551	974	6,801	2,656	4,145	2,235	143	265	1,827	641	1,187
Owner-occupied units.....	4,979	320	587	4,071	1,569	2,502	1,174	62	147	964	310	654
Renter-occupied units.....	3,347	230	387	2,730	1,087	1,643	1,062	81	118	863	330	532
Public.....	424	10	34	380	136	244	207	7	22	179	63	116
Private.....	2,923	220	353	2,350	952	1,398	854	74	96	684	268	416
WHITE												
Family Status and Composition												
Total.....	28,896	3,460	5,120	20,316	9,709	10,607	3,152	242	484	2,426	923	1,502
In families.....	20,810	2,927	4,132	13,751	7,148	6,603	1,148	122	217	809	364	445
Head.....	11,255	1,562	2,230	7,463	3,849	3,614	683	66	146	472	195	277
Wife of head.....	7,400	1,235	1,658	4,507	2,746	1,762	399	51	68	281	154	126
Other family members.....	2,154	130	244	1,780	553	1,227	65	6	4	56	14	42
In subfamilies.....	157	3	33	120	44	77	37	1	9	28	13	15
Unrelated individuals.....	8,086	533	988	6,566	2,561	4,004	2,004	120	267	1,617	560	1,057
Living alone.....	7,565	488	871	6,206	2,386	3,820	1,859	109	229	1,520	509	1,011
Living with nonrelatives.....	521	45	116	360	176	184	145	11	37	96	51	46
In households.....	445	39	98	307	147	160	123	9	37	76	38	38
Type of Residence												
Total.....	28,896	3,460	5,120	20,316	9,709	10,607	3,152	242	484	2,426	923	1,502
Metropolitan areas.....	18,091	2,248	3,273	12,571	6,091	6,480	1,577	131	250	1,195	495	700
In central cities.....	7,836	884	1,369	5,583	2,674	2,909	832	80	115	638	291	347
Outside central cities.....	10,256	1,364	1,904	6,987	3,417	3,571	744	52	136	557	204	353
Nonmetropolitan areas.....	10,805	1,212	1,847	7,746	3,618	4,128	1,575	111	233	1,231	428	802
Work Experience												
Total.....	28,896	3,460	5,120	20,316	9,709	10,607	3,152	242	484	2,426	923	1,502
Worked last year.....	8,324	2,139	2,563	3,622	2,572	1,049	364	86	109	169	103	65
50 to 52 weeks.....	5,015	1,590	1,669	1,756	1,230	525	188	46	57	85	53	33
49 weeks or less.....	3,309	549	894	1,866	1,342	524	176	40	52	84	51	33
Did not work last year.....	20,572	1,321	2,557	16,695	7,137	9,558	2,788	157	375	2,257	820	1,437
Retired.....	8,740	206	740	7,794	3,239	4,555	846	20	84	742	260	482

Table 28. Poverty Status in 1977 of Persons 60 Years and Over, by Age and Selected Characteristics—Continued

(In thousands. Persons as of March 1978. For meaning of symbols, see text)

	All income levels						Below poverty level					
Subject	Total, 60 years and over	60 and 61 years	62 to 64 years	65 years and over			Total, 60 years and over	60 and 61 years	62 to 64 years	65 years and over		
				Total	65 to 71 years	72 years and over				Total	65 to 71 years	72 years and over
WHITE--Continued												
Tenure and Living Arrangements												
Persons in households.....	28,896	3,460	5,120	20,316	9,709	10,607	3,152	242	484	2,426	923	1,502
Living with relatives.....	20,926	2,936	4,168	13,822	7,188	6,634	1,196	126	229	841	386	455
Owner-occupied units.....	17,630	2,542	3,555	11,533	6,096	5,436	863	90	165	608	270	339
Renter-occupied units.....	3,296	393	613	2,290	1,092	1,198	334	37	64	233	117	116
Public.....	138	14	28	96	42	54	26	1	3	22	11	11
Private.....	3,158	379	585	2,194	1,050	1,144	307	35	61	211	106	105
Living with nonrelatives only.....	406	36	81	288	135	153	97	7	26	64	28	35
Owner-occupied units.....	285	26	56	202	92	110	59	4	15	40	19	21
Renter-occupied units.....	121	11	24	86	43	43	38	3	11	24	9	15
Public.....	-	-	-	-	-	-	-	-	-	-	-	-
Private.....	121	11	24	86	43	43	38	3	11	24	9	15
Living alone.....	7,565	488	871	6,206	2,386	3,820	1,859	109	229	1,520	509	1,011
Owner-occupied units.....	4,624	301	536	3,787	1,458	2,329	1,011	54	129	828	266	562
Renter-occupied units.....	2,941	187	335	2,419	928	1,491	848	55	100	692	243	449
Public.....	330	5	25	300	94	207	148	2	17	129	41	89
Private.....	2,611	182	311	2,119	834	1,285	699	54	83	563	202	360
BLACK												
Family Status and Composition												
Total.....	2,721	313	478	1,930	1,036	894	909	81	127	701	345	355
In families.....	1,850	248	356	1,246	698	548	461	44	79	338	181	157
Head.....	1,045	153	213	679	380	299	291	27	50	214	111	103
Wife of head.....	487	76	116	295	198	97	122	16	27	79	46	33
Other family members.....	319	19	28	272	119	153	48	1	2	45	24	21
In subfamilies.....	21	2	-	19	10	9	5	2	-	4	4	-
Unrelated individuals.....	871	65	122	684	338	346	448	38	48	362	164	198
Living alone.....	699	59	100	540	251	288	363	34	34	295	125	170
Living with nonrelatives.....	172	6	22	144	86	58	85	4	14	67	39	28
In households.....	155	6	20	129	76	53	73	4	13	57	33	23
Type of Residence												
Total.....	2,721	313	478	1,930	1,036	894	909	81	127	701	345	355
Metropolitan areas.....	1,801	210	313	1,279	697	581	487	48	58	382	193	189
In central cities.....	1,450	181	248	1,021	546	475	392	42	47	303	145	159
Outside central cities.....	352	29	65	258	151	107	95	6	11	78	48	30
Nonmetropolitan areas.....	920	103	165	651	338	313	422	33	69	319	152	167
Work Experience												
Total.....	2,721	313	478	1,930	1,036	894	909	81	127	701	345	355
Worked last year.....	823	187	237	400	304	96	140	26	40	74	56	18
50 to 52 weeks.....	451	128	151	171	120	51	50	14	13	23	12	10
49 weeks or less.....	373	59	85	229	184	45	91	13	27	51	43	8
Did not work last year.....	1,897	126	242	1,530	732	798	768	55	87	626	290	337
Retired.....	663	8	60	594	278	317	206	2	16	187	83	104
Tenure and Living Arrangements												
Persons in households.....	2,721	313	478	1,930	1,036	894	909	81	127	701	345	355
Living with relatives.....	1,899	249	363	1,287	730	557	486	44	84	357	195	162
Owner-occupied units.....	1,333	166	270	897	506	391	290	24	54	213	112	100
Renter-occupied units.....	566	83	93	390	224	166	195	20	30	145	83	62
Public.....	95	12	15	68	38	30	38	4	6	28	14	14
Private.....	471	71	78	322	186	136	158	16	24	117	69	48
Living with nonrelatives only.....	124	5	15	103	55	48	60	3	9	48	25	23
Owner-occupied units.....	60	5	5	49	23	26	26	3	3	19	9	10
Renter-occupied units.....	64	-	10	54	32	22	35	-	6	29	16	13
Public.....	-	-	-	-	-	-	-	-	-	-	-	-
Private.....	64	-	10	54	32	22	35	-	6	29	16	13
Living alone.....	699	59	100	540	251	288	363	34	34	295	125	170
Owner-occupied units.....	314	18	49	246	98	148	154	8	18	128	38	90
Renter-occupied units.....	385	40	51	294	153	140	209	26	16	167	87	80
Public.....	90	5	10	76	40	35	56	5	5	46	22	25
Private.....	294	35	41	218	113	105	153	21	12	121	65	55

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, No. 119, and unpublished 1978 Current Population Survey data.

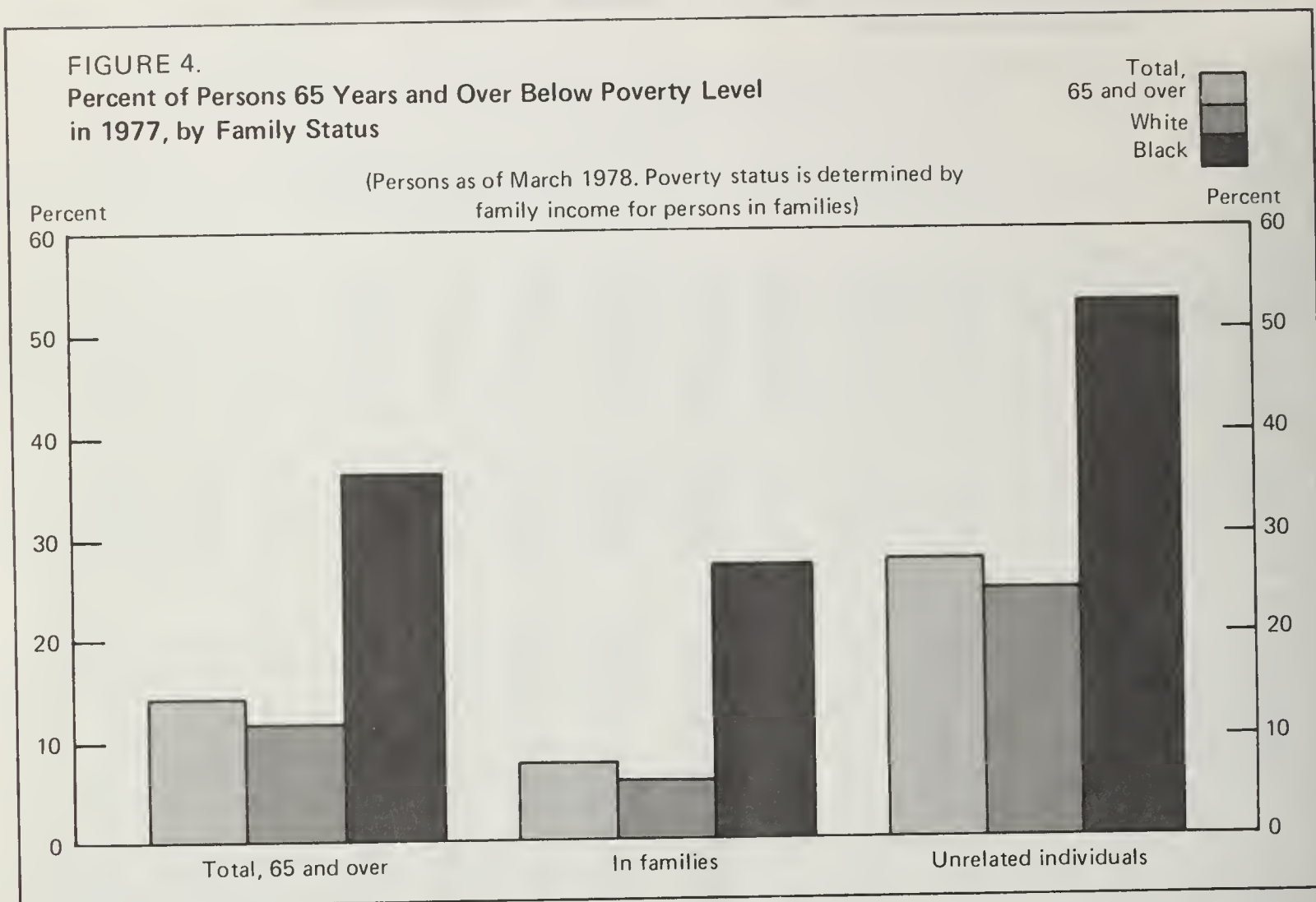


Table 29. Poverty Status of Persons of All Ages and Persons 65 Years and Over:
1970 to 1977

(Numbers in thousands. Persons as of March of following year. Numbers exclude unrelated individuals under 14 years old, inmates of institutions, and members of the Armed Forces living in barracks)

Year	All persons below poverty level		Persons 65 years and over below poverty level	
	Number	Percent	Number	Percent
1977.....	24,720	11.6	3,177	14.1
1976.....	24,975	11.8	3,313	15.0
1975.....	25,877	12.3	3,317	15.3
1974 ^r	23,370	11.2	3,085	14.6
1974.....	24,260	11.6	3,308	15.7
1973.....	22,973	11.1	3,354	16.3
1972.....	24,460	11.9	3,738	18.6
1971.....	25,559	12.5	4,273	21.6
1970.....	25,420	12.6	4,709	24.5

^rBased on revised methodology. See Current Population Report, Series P-60, No. 115 for explanation.

¹Beginning with March 1970 CPS, data based on 1970 census population controls.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, No. 119.

Table 30. Persons 65 Years and Over Below the Poverty Level in 1977, by Race, Spanish Origin, and Sex

(Numbers in thousands. Persons as of March 1978. For meaning of symbols, see text)

Race, Spanish origin and sex	Number below poverty level						Poverty rate					
	Total	In families				Unrelated individuals	Total	In families				Unrelated individuals
		Total	Head	Wife	Other family members			Total	Head	Wife	Other family members	
ALL RACES												
Both sexes.....	3,177	1,176	710	364	102	2,001	14.1	7.8	8.6	7.5	4.8	27.3
Male.....	961	575	551	(X)	24	386	10.5	7.6	7.8	(X)	5.0	23.5
Female.....	2,216	601	159	364	77	1,615	16.7	7.9	13.7	7.5	4.7	28.4
WHITE												
Both sexes.....	2,426	809	472	281	56	1,617	11.9	5.9	6.3	6.2	3.1	24.6
Male.....	686	414	403	(X)	11	273	8.3	6.0	6.2	(X)	3.0	20.1
Female.....	1,739	395	70	281	45	1,344	14.9	5.8	7.5	6.2	3.2	25.8
BLACK												
Both sexes.....	701	338	214	79	45	362	36.3	27.1	31.5	26.9	16.4	53.0
Male.....	243	144	132	(X)	12	99	29.7	25.4	28.4	(X)	11.5	39.4
Female.....	457	194	82	79	33	263	41.2	28.6	38.3	26.8	19.6	60.8
SPANISH ORIGIN ¹												
Both sexes....	113	51	35	10	6	62	21.9	12.9	18.1	11.4	5.3	50.3
Male.....	55	31	29	(X)	2	24	23.7	16.4	17.7	(X)	(B)	54.9
Female.....	58	21	7	10	4	38	20.4	10.2	19.9	11.4	4.4	47.8

¹Persons of Spanish origin may be of any race.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, No. 119.

Table 31. Source of Income in 1977 of Families With Heads 65 Years and Over and of Unrelated Individuals 65 Years and Over, by Race and Poverty Status

(Numbers in thousands. Families and unrelated individuals as of March 1978. For meaning of symbols, see text)

Source of income	All races			White			Black		
	Total	Below poverty level		Total	Below poverty level		Total	Below poverty level	
		Number	Percent of total		Number	Percent of total		Number	Percent of total
FAMILIES									
Head, 65 years and over....	8,212	710	8.6	7,463	472	6.3	679	214	31.5
With earnings only.....	89	13	14.6	69	5	(B)	19	7	(B)
With earnings and other income...	3,868	164	4.2	3,448	90	2.6	383	68	17.7
With other income only.....	4,248	527	12.4	3,940	371	9.4	276	139	50.2
Social Security income only....	585	180	30.8	516	142	27.5	62	31	(B)
Public Assistance income only..	3	3	(B)	1	1	(B)	2	2	(B)
Supplemental Security income only.....	41	37	(B)	21	19	(B)	18	17	(B)
Social Security and Supplemental Security income only.....	227	112	49.4	155	65	42.1	70	47	(B)
All other combinations.....	3,392	195	5.7	3,246	143	4.4	125	42	71.2
No income.....	6	6	(B)	6	6	(B)	-	-	(B)
UNRELATED INDIVIDUALS									
Total, 65 years and over...	7,319	2,001	27.3	6,566	1,617	24.6	684	362	53.0
With earnings only.....	68	20	(B)	56	20	(B)	12	-	(B)
With earnings and other income...	1,205	127	10.5	1,078	99	9.2	115	28	24.4
With other income only.....	6,027	1,836	30.5	5,415	1,481	27.3	556	333	59.9
Social Security income only....	1,237	702	56.8	1,061	578	54.4	163	113	69.2
Public Assistance income only..	29	26	(B)	16	16	(B)	13	11	(B)
Supplemental Security income only.....	113	100	88.5	76	68	88.9	37	32	(B)
Social Security and Supplemental Security income only.....	558	332	59.5	408	227	55.7	143	103	72.0
All other combinations.....	4,089	675	16.5	3,854	593	15.4	202	75	37.1
No income.....	19	19	(B)	17	17	(B)	1	1	(B)

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, No. 119.

Table 32. Poverty Status in 1975 of Family Members and Unrelated Individuals 65 Years and Over, for the United States, Regions, Divisions, and States

(Number in thousands Family members and unrelated individuals as of Spring 1976. For meaning of symbols see text)

Region, division, and State	All persons			Family heads			Unrelated individuals		
	Total	Below current poverty level		Total	Below current poverty level		Total	Below current poverty level	
		Number	Rate		Number	Rate		Number	Rate
United States.....	21,721	3,049	14.0	8,160	662	8.1	6,721	1,976	29.4
Northeast.....	5,351	497	9.3	1,991	83	4.2	1,613	364	22.6
New England.....	1,312	110	8.4	480	12	2.6	400	90	22.5
Maine.....	121	18	14.7	43	2	(B)	41	14	(B)
New Hampshire.....	84	8	9.9	30	1	(B)	27	7	(B)
Vermont.....	49	8	(B)	17	1	(B)	19	6	(B)
Massachusetts.....	634	38	5.9	232	2	0.9	191	33	17.5
Rhode Island.....	109	15	13.6	38	2	(B)	34	12	(B)
Connecticut.....	314	24	7.8	120	4	3.5	88	17	19.8
Middle Atlantic.....	4,039	387	9.6	1,511	71	4.7	1,214	274	22.6
New York.....	1,948	176	9.1	697	30	4.3	640	129	20.2
New Jersey.....	749	61	8.2	291	13	4.4	180	38	21.3
Pennsylvania.....	1,342	149	11.1	523	28	5.3	394	107	27.1
North Central.....	5,864	679	11.6	2,141	110	5.1	1,920	495	25.8
East North Central.....	3,921	398	10.2	1,427	60	4.2	1,264	300	23.7
Ohio.....	1,028	116	11.3	387	21	5.5	320	84	26.1
Indiana.....	511	56	11.0	190	9	4.5	171	43	25.0
Illinois.....	1,108	112	10.2	390	16	4.1	366	83	22.6
Michigan.....	787	71	9.0	289	11	3.9	238	54	22.8
Wisconsin.....	487	42	8.6	171	3	1.6	169	37	21.6
West North Central.....	1,943	280	14.4	714	50	7.0	656	195	29.7
Minnesota.....	414	53	12.8	152	10	6.4	143	36	25.2
Iowa.....	343	43	12.6	121	6	4.8	121	33	27.1
Missouri.....	582	98	16.9	213	19	9.0	193	68	35.2
North Dakota.....	69	11	(B)	27	2	(B)	22	7	(B)
South Dakota.....	81	14	17.1	32	3	(B)	24	8	(B)
Nebraska.....	183	28	15.4	62	5	(B)	68	20	(B)
Kansas.....	271	33	12.2	107	6	5.4	86	22	26.0
South.....	7,018	1,539	21.9	2,746	399	14.5	2,076	894	43.1
South Atlantic.....	3,566	638	17.9	1,401	174	12.4	1,003	367	36.6
Delaware.....	49	6	(B)	17	1	(B)	15	4	(B)
Maryland.....	332	38	11.4	128	7	5.4	90	27	30.0
District of Columbia.....	68	9	(B)	23	2	(B)	25	6	(B)
Virginia.....	416	76	18.2	158	21	13.4	121	43	35.7
West Virginia.....	209	41	19.4	85	10	11.5	71	27	38.2
North Carolina.....	488	120	24.7	206	35	16.9	124	64	51.7
South Carolina.....	227	61	26.8	93	20	21.5	59	28	47.8
Georgia.....	421	134	31.9	161	42	26.1	139	70	50.2
Florida.....	1,356	153	11.3	530	36	6.8	360	97	26.9
East South Central.....	1,411	402	28.5	566	104	18.3	409	223	54.5
Kentucky.....	359	81	22.6	142	21	14.9	98	44	45.6
Tennessee.....	436	113	26.0	186	34	18.3	121	58	47.8
Alabama.....	370	117	31.6	140	26	18.3	115	69	60.2
Mississippi.....	246	91	37.0	98	23	23.0	76	52	68.3
West South Central.....	2,042	499	24.4	779	121	15.6	664	304	45.8
Arkansas.....	264	77	29.1	111	21	18.6	71	42	(B)
Louisiana.....	336	99	29.3	129	27	20.6	107	56	52.3
Oklahoma.....	321	71	22.1	126	19	14.7	102	46	44.8
Texas.....	1,121	253	22.5	412	56	13.5	384	160	41.7
West.....	3,488	334	9.6	1,282	70	5.5	1,112	223	20.0
Mountain.....	828	114	13.7	320	25	7.7	252	75	29.8
Montana.....	72	10	(B)	27	2	(B)	25	7	(B)
Idaho.....	77	12	15.1	32	3	(B)	23	7	(B)
Wyoming.....	32	4	(B)	13	1	(B)	11	3	(B)
Colorado.....	197	28	14.1	71	4	(B)	64	21	(B)
New Mexico.....	90	18	19.5	37	6	(B)	27	8	(B)
Arizona.....	225	27	12.2	89	7	7.7	61	18	(B)
Utah.....	89	12	13.3	35	2	(B)	27	9	(B)
Nevada.....	45	3	(B)	16	-	(B)	14	3	(B)
Pacific.....	2,660	221	8.3	962	45	4.7	860	148	17.2
Washington.....	351	34	9.8	128	5	3.6	118	27	23.0
Oregon.....	251	28	11.4	93	4	4.5	80	22	27.7
California.....	1,990	151	7.6	716	35	4.9	647	94	14.5
Alaska.....	9	-	(B)	3	-	(B)	2	-	(B)
Hawaii.....	59	6	(B)	21	1	(B)	12	4	(B)

Source: U.S. Department of Commerce, U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 119.

Housing

In 1978, 15 million households were maintained by persons 65 years old and over. Approximately 3 out of every 4 of these were owner-occupied households. Sixty-two percent of the owner-occupied households were families and 38 percent were older men or women living alone or with nonrelatives only (primary individuals). Among the primary individuals 65 and over, women outnumbered men by 4 million. Most women who are primary individuals are widows living alone after the death of their husbands.

Older householders residing in the urban portions of standard metropolitan statistical areas (SMSA's) were less likely to own their homes (63 percent) than those living in rural areas (84 percent), although the number owning their homes in urban parts of SMSA's (8.3 million) was nearly double that in rural areas (4.3 million).

In 1976, 45 percent of all households maintained by a person 65 years and over consisted of an older couple with no nonrelatives living in the household. Eighty-three percent owned their homes.

Table 33. Households With Head 55 Years and Over, by Race, Spanish Origin, Tenure, Type, and Age of Head: March 1978

(In thousands. Noninstitutional population)

Race, Spanish origin, and age of head	All households	Owner households				Renter households			
		Total	Primary families	Primary individuals		Total	Primary families	Primary individuals	
				Male	Female			Male	Female
ALL RACES									
Head, 55 years and over..	27,408	20,441	14,628	1,276	4,538	6,967	2,875	1,104	2,989
55 to 64 years.....	12,183	9,457	7,868	411	1,178	2,726	1,431	477	818
65 to 74 years.....	9,383	6,942	4,650	427	1,865	2,441	904	383	1,155
75 years and over.....	5,842	4,042	2,110	438	1,495	1,800	540	244	1,016
WHITE									
Head, 55 years and over..	24,710	18,833	13,490	1,141	4,202	5,878	2,369	876	2,633
55 to 64 years.....	10,884	8,689	7,256	359	1,074	2,196	1,146	364	685
65 to 74 years.....	8,462	6,399	4,285	383	1,731	2,063	742	302	1,019
75 years and over.....	5,364	3,745	1,949	399	1,397	1,619	481	210	929
BLACK									
Head, 55 years and over..	2,431	1,427	1,010	118	300	1,004	449	213	342
55 to 64 years.....	1,163	682	535	51	96	481	246	106	129
65 to 74 years.....	842	489	329	40	121	353	147	74	132
75 years and over.....	426	256	146	27	83	170	56	33	81
SPANISH ORIGIN ¹									
Head, 55 years and over	630	365	300	18	46	266	153	41	71
55 to 64 years.....	321	188	172	3	14	133	86	15	31
65 to 74 years.....	220	123	94	8	20	97	51	17	29
75 years and over.....	89	54	34	7	12	36	16	9	11

¹Persons of Spanish origin may be of any race.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 338.

Table 34. Households With Head 65 Years and Over, by Tenure and Type of Household, for Regions: 1976

(Numbers in thousands)

Tenure and household composition	Number					Percent				
	United States	Northeast	North Central	South	West	United States	Northeast	North Central	South	West
ALL OCCUPIED HOUSING UNITS										
Total.....	14,840	3,422	4,059	4,877	2,481	100.0	100.0	100.0	100.0	100.0
Owner occupied.....	10,477	2,082	3,025	3,648	1,720	70.6	60.8	74.5	74.8	69.3
Two-or-more person households....	6,875	1,419	1,939	2,383	1,133	46.3	41.5	47.8	48.9	45.7
Male head, wife present, no nonrelatives.....	5,530	1,094	1,586	1,871	979	37.3	32.0	39.1	38.4	39.5
Other male head.....	378	101	96	132	49	2.5	3.0	2.4	2.7	2.0
Female head.....	967	224	257	380	105	6.5	6.5	6.3	7.8	4.2
One-person households.....	3,602	663	1,086	1,265	587	24.3	19.4	26.8	25.9	23.7
Renter occupied.....	4,363	1,340	1,034	1,229	761	29.4	39.2	25.5	25.2	30.7
Two-or-more person households....	1,606	549	325	488	244	10.8	16.0	8.0	10.0	9.8
Male head, wife present, no nonrelatives.....	1,127	392	233	318	184	7.6	11.5	5.7	6.5	7.4
Other male head.....	88	30	14	24	21	0.6	0.9	0.3	0.5	0.9
Female head.....	391	127	78	146	39	2.6	3.7	1.9	3.0	1.6
One-person households.....	2,757	791	709	741	517	18.6	23.1	17.5	15.2	20.8

Source: U.S. Department of Commerce, Bureau of the Census, Current Housing Reports, Series H-150-76, Part A.

Table 35. Households With Head 65 Years and Over, by Tenure and Type of Household, for Standard Metropolitan Statistical Areas: 1976

(Numbers in thousands)

Tenure and household composition	Total	Urban			Rural				
		Total	Inside SMSA's	Outside SMSA's	Total	Nonfarm	Farm	Inside SMSA's	Outside SMSA's
All occupied housing units.....	14,840	10,579	8,272	2,306	4,261	3,582	677	1,041	3,221
Percent distribution.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Owner occupied.....	70.6	65.4	63.3	72.8	83.5	82.3	90.3	85.1	83.0
Two-or-more person households.....	46.3	42.4	41.7	45.0	56.0	53.5	69.4	58.1	55.4
Male head, wife present, no nonrelatives.....	37.3	33.7	32.7	36.9	46.2	44.2	57.0	47.8	45.7
Other male head.....	2.5	2.3	2.2	2.8	3.1	2.8	4.7	3.2	3.1
Female head.....	6.5	6.4	6.7	5.3	6.7	6.5	7.7	7.1	6.6
One-person households.....	24.3	23.0	21.6	27.8	27.5	28.8	20.8	27.0	27.7
Renter occupied.....	29.4	34.6	36.7	27.2	16.5	17.7	9.7	14.9	17.0
Two-or-more person households.....	10.8	12.2	13.4	7.9	7.4	7.6	5.9	7.4	7.4
Male head, wife present, no nonrelatives.....	7.6	8.6	9.5	5.4	5.1	5.1	5.0	4.8	5.2
Other male head.....	0.6	0.6	0.7	0.4	0.6	0.6	0.3	1.1	0.4
Female head.....	2.6	3.0	3.3	2.1	1.7	1.9	0.6	1.5	1.7
One-person households.....	18.6	22.4	23.3	19.3	9.1	10.1	3.8	7.5	9.6

Source: U.S. Department of Commerce, Bureau of the Census, Current Housing Reports, Series H-150-76, Part E.

Health and Health Services

Persons 65 years and over are less likely than the general population to suffer an injury but are considerably more likely to have a limitation of activity because of a health or physical condition. They also have a higher average number of restricted activity days and more days of bed disability. In 1977, about 43 percent of the population 65 and over had an activity limitation, compared with 13 percent of the total population. However, 35 percent of the total population, compared with 21 percent of persons 65 years and over, were injured during the year.

Persons 65 and over experienced an average of about 9 days of restricted activity each quarter in 1977. On the average, they stayed in bed 3 or 4 days during the quarter.

On the average, 7 out of every 10 persons 65 years and over had visited a physician during the previous 6 months and 1 out of every 4 had visited a dentist. This population group made an average of about 6.5 visits to a physician and 1.3 visits to a dentist during 1977. About 6 percent had not

visited a physician and about 45 percent had not visited a dentist in at least 5 years.

By far the major cause of death in 1976 of persons 65 years and over was diseases of the heart. Among the 10 leading causes, diseases of the heart accounted for nearly as many deaths as did the remaining nine causes combined. The second leading cause was malignant neoplasms, followed by cerebrovascular diseases. Accidents ranked seventh as a cause of death.

Persons 65 years and over in 1976 could expect, on the average, another 16 years of life. For men, the expectation is nearer 14 years and for women 18 years. There is no significant difference in the life expectancies for Blacks and for Whites who were 65 years old in 1976. However, assuming that the death rates in 1976 apply throughout the lifetime of a newborn group of individuals, Blacks and other races born in 1976 had a shorter life expectancy than Whites born in that year—68.3 years and 73.5 years, respectively.

Table 36. Selected Health Indicators for Total Population and Population 65 Years and Over, by Sex: 1977

(Civilian noninstitutional population)

Indicator	Both sexes		Male		Female	
	All ages	65 years and over	All ages	65 years and over	All ages	65 years and over
Total population...thousands..	212,153	22,266	102,384	9,197	109,769	13,070
Percent with activity limitation...	13.5	43.0	13.9	47.7	13.1	39.7
In major activity.....	10.4	37.3	10.9	43.8	9.9	32.8
Days of restricted activity per person per year.....	17.8	36.5	15.8	33.0	19.6	38.9
Days of bed disability per person per year.....	6.9	14.5	5.8	12.7	7.9	15.8
Persons injured per 100 persons per year.....	34.8	21.4	41.3	18.7	28.8	23.3
Days of bed disability with injury per 100 persons per year.....	89.4	192.9	87.6	155.1	91.1	219.5

Source: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Vital and Health Statistics, Series 10, No. 126.

Table 37. Mean Days of Disability Per Person Per Quarter for All Persons 65 Years and Over, by Type of Disability and Sex: 1977

(Noninstitutional population)

Type of disability and sex	Quarter			
	January-March	April-June	July-September	October-December
BOTH SEXES, 65 YEARS AND OVER				
Mean days of restricted activity.....	9.4	8.8	9.3	8.9
Mean days of bed disability.....	4.0	3.4	3.6	3.5
Mean days lost from work.....	(*)	(*)	1.5	1.3
MALE, 65 YEARS AND OVER				
Mean days of restricted activity.....	8.8	6.6	9.1	8.5
Mean days of bed disability.....	3.8	2.7	3.2	2.9
Mean days lost from work.....	(*)	(*)	(*)	(*)
FEMALE, 65 YEARS AND OVER				
Mean days of restricted activity.....	9.9	10.4	9.4	9.2
Mean days of bed disability.....	4.2	3.9	3.8	3.9
Mean days lost from work.....	(*)	(*)	(*)	(*)

*Figure does not meet standards of reliability or precision (more than 30 percent relative standard error).

Source: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Vital and Health Statistics, Series 10, No. 126.

Table 38. Time Interval Since Last Physician and Dental Visit and Visits Per Person Per Year, by Sex, for Persons 65 Years and Over: 1977

(Noninstitutional population. For meaning of symbols, see text)

Time interval since last visit	Physician visit			Dental visit		
	Both sexes	Male	Female	Both sexes	Male	Female
Persons 65 years and over ¹						
thousands..	22,266	9,197	13,070	22,266	9,197	13,070
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
Under 6 months.....	69.9	67.9	71.4	23.6	22.8	24.1
6 to 11 months.....	9.7	9.7	9.7	7.8	7.8	7.8
1 year.....	6.5	6.8	6.4	7.9	7.8	8.0
2 to 4 years.....	7.8	8.7	7.1	14.1	14.3	14.0
5 years or more.....	5.5	6.2	5.1	45.2	45.6	44.9
Never.....	-	-	-	0.6	0.9	0.4
Visits per person per year.....	6.5	6.4	6.6	1.3	1.3	1.3

¹Includes a small number of persons not reporting on timing of last visit.

Source: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Vital and Health Statistics, Series 10, No. 126.

Table 39. Death Rates for the Ten Leading Causes of Death, for Persons 65 Years and Over, by Age: 1976

(Deaths per 100,000 population)

Cause of death (by rank)	Total, 65 years and over	65 to 74 years	75 to 84 years	85 years and over
All causes.....	5,428.9	3,127.6	7,331.6	15,486.9
Diseases of the heart.....	2,393.5	1,286.9	3,263.7	7,384.3
Malignant neoplasms.....	979.0	786.3	1,248.6	1,441.5
Cerebrovascular diseases.....	694.6	280.1	1,014.0	2,586.8
Influenza or pneumonia.....	211.1	70.1	289.3	959.2
Arteriosclerosis.....	122.2	25.8	152.5	714.3
Diabetes mellitus.....	108.1	70.0	155.8	219.2
Accidents.....	104.5	62.2	134.5	306.7
Motor vehicles.....	25.2	21.7	32.3	26.0
All other.....	79.3	40.4	102.2	280.7
Bronchitis, emphysema, and asthma.....	76.8	60.7	101.4	108.5
Cirrhosis of liver.....	36.5	42.6	29.3	18.0
Nephritis and nephrosis.....	25.0	15.2	34.1	64.6
All other causes.....	677.5	427.8	908.6	1,683.8

Source: U.S. Department of Health, Education and Welfare, National Center for Health Statistics, Monthly Vital Statistics Report, Vol. 26, No. 12, Supplement 2, March 1978.

Table 40. Average Number of Years of Life Remaining at Age 65 and at Birth, by Race and Sex: 1976

Sex	All races		White		Black and other races	
	At age 65	At birth	At age 65	At birth	At age 65	At birth
Both sexes.....	16.0	72.8	16.1	73.5	15.8	68.3
Male.....	13.7	69.0	13.7	69.7	13.8	64.1
Female.....	18.0	76.7	18.1	77.3	17.6	72.6

Source: U.S. Department of Health, Education, and Welfare, Public Health Service, Monthly Vital Statistics Report, Vol. 26, No. 12, Supplement (2), March 1978

Crime Victimization

The population 65 and over suffered from crimes against the person at only about one-fourth the rate during 1977 as did the population 12 years and over—about 30 crimes per 1,000 population compared with about 130 per 1,000. For each of the two age groups, larceny was by far the most frequent crime (about 75 percent).

In crimes against households, those households maintained by a person 65 years and over were victimized to a lesser extent than households in general for each of the three crimes considered. Burglary and household larceny accounted for the great majority of crimes against households and motor vehicle theft accounted for a minor portion.

Table 41. Victimization From Selected Crimes Against Persons, for the Population 12 Years and Over and 65 Years and Over, by Race: 1977

(Rate per 1,000 population. For meaning of symbols, see text)

Crime	Persons 12 years old and over			Persons 65 years old and over		
	Total	White	Black	Total	White	Black
Crimes of violence.....	33.9	33.0	41.9	7.5	7.0	13.4
Rape and attempted rape.....	0.9	0.9	1.0	0.1	0.1	-
Robbery and attempted robbery....	6.2	5.4	13.0	3.4	3.0	7.9
With injury.....	2.2	1.9	5.2	1.9	1.8	3.4
Without injury.....	4.0	3.5	7.9	1.4	1.1	4.4
Assault.....	26.8	26.8	27.9	4.0	3.9	5.6
Aggravated.....	10.0	9.6	13.9	1.2	1.0	2.7
Simple.....	16.8	17.2	14.0	2.8	2.8	2.8
Personal larceny.....	97.3	98.2	90.0	23.6	23.1	26.9

Source: U.S. Department of Justice, Law Enforcement Assistance Administration, National Criminal Justice Information and Statistical Service, unpublished data from the National Crime Survey.

Table 42. Victimization From Selected Crimes Against Households, for Households With Heads 12 Years and Over and 65 Years and Over: 1977

(Rate per 1,000 households)

Crime	Head, 12 years and over	Head, 65 years and over
Total households.....thousands..	76,412	15,168
Burglary.....	88.5	49.7
Household larceny.....	123.3	57.4
Motor vehicle theft.....	17.0	3.8

Source: U.S. Department of Justice, Law Enforcement Assistance Administration, National Criminal Justice Information and Statistical Services, unpublished data from the National Crime Survey.

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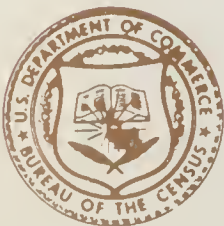
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Series P-23, No. 86
Issued August 1979

Selected Characteristics of Travel to Work in the Philadelphia SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the Philadelphia SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the SMSA in 1975, about 799,000 workers, was comprised of persons who both lived and worked in the suburbs (table 1). In comparison, only about 175,000 workers who lived in the suburbs commuted into Philadelphia to work. Approximately 461,000 of the workers who lived in Philadelphia also worked there, while 70,000 workers made the reverse trip from the city to suburban employment. Less than 1 percent of the workers living in Philadelphia worked outside the SMSA, compared to 6 percent (about 59,000 persons) of those living in the suburbs.

MEANS OF TRANSPORTATION TO WORK

Of the more than 1.7 million workers living in the Philadelphia SMSA in 1975, the survey results show that the majority (61 percent) usually drove to work alone (table 2). Similar proportions, about 15 percent each, used carpools and public transportation to get to work, while 6 percent walked, 2 percent worked at home, and 1 percent used other

means. Workers who lived in the suburbs were more likely to drive alone to work (69 percent) than residents of the city (45 percent), while workers who lived in Philadelphia were more likely to use public transportation (30 percent) than suburban residents (7 percent).

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were more likely than men to carpool or use public transportation (table 3).

Race. Black workers showed a lower incidence of driving alone (44 percent) than White¹ workers (63 percent), and a correspondingly higher incidence of using public transportation (32 percent compared with 12 percent). The proportion of Blacks and Whites who traveled in carpools was not significantly different (table 3).

Household relationship. Female household heads were less likely to drive alone to work and more likely to use public transportation than male household heads in 1975 (table 3). Comparing working wives with female household heads, the data indicate that the wives were more likely to drive alone or carpool, and less likely to use public transit than female heads of households. Thirty percent of the female heads used public transportation compared with 15 percent of the working wives.

Earnings. Comparing the three most widely used means of transportation, workers who drove alone to work had the highest median earnings (\$10,611), followed by those in carpools (\$8,920), and users of public transit (\$7,732).

¹The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was about 9 miles in 1975 (table 4). Workers who drove alone reported traveling 9 miles, on the average, while workers who carpooled or used public transportation traveled about 10 miles to get to work.

Travel time by means of transportation. The average commuting trip in the SMSA took 24 minutes in 1975 (table 5). Workers who drove alone reported an average of 21 minutes to get to work, compared with 24 minutes for those who carpooled. Public transportation users spent an average of 41 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The **Travel-to-Work Supplement to the Annual Housing Survey**. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 14,447 sample households in the Philadelphia SMSA were eligible to answer the inquiries contained in the Travel-to-Work Supplement. The interviews resulted in responses from 29,190 workers 14

years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)

Albany-Schenectady-Troy, N.Y.
Anaheim-Santa Ana-Garden Grove,
Calif.
Boston, Mass.*
Dallas, Tex.
Detroit, Mich.*
Fort Worth, Tex.
Los Angeles-Long Beach, Calif.*
Madison, Wis.†
Memphis, Tenn.-Ark.
Minneapolis-St. Paul, Minn.
Newark, N.J.
Orlando, Fla.
Phoenix, Ariz.
Pittsburgh, Pa.
Saginaw, Mich.
Salt Lake City, Utah
Spokane, Wash.
Tacoma, Wash.
Washington, D.C.-Md.-Va.*
Wichita, Kans.

SURVEY GROUP II (1975 to 1976)

Atlanta, Ga.*
Chicago, Ill.*
Cincinnati, Ohio-Ky.-Ind.
Colorado Springs, Colo.
Columbus, Ohio
Hartford, Conn.
Kansas City, Mo.-Kans.
Miami, Fla.
Milwaukee, Wis.
New Orleans, La.
Newport News-Hampton, Va.
Paterson-Clifton-Passaic, N.J.
Philadelphia, Pa.-N.J.*
Portland, Oreg.-Wash.
Rochester, N.Y.
San Antonio, Tex.
San Bernardino-Riverside-Ontario,
Calif.
San Diego, Calif.
San Francisco-Oakland, Calif.*
Springfield-Chicopee-Holyoke,
Mass.-Conn.

SURVEY GROUP III (1976 to 1977)

Allentown-Bethlehem-Easton, Pa.-N.J.
Baltimore, Md.
Birmingham, Ala.
Buffalo, N.Y.
Cleveland, Ohio
Denver, Colo.
Grand Rapids, Mich.
Honolulu, Hawaii
Houston, Tex.*
Indianapolis, Ind.
Las Vegas, Nev.
Louisville, Ky.-Ind.
New York, N.Y.*
Oklahoma City, Okla.
Omaha, Nebr.-Iowa
Providence-Pawtucket-Warwick, R.I.-
Mass.
Raleigh, N.C.
Sacramento, Calif.
St. Louis, Mo.-Ill.*
Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

MSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group I are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the Philadelphia SMSA

Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Place of residence	All workers	Reported a fixed place of work							No fixed place of work	Place of work not reported
		Total	Inside the SMSA					Outside the SMSA		
			Total	Phila- delphia city	Outside central city					
					Total	Pennsyl- vania part	New Jersey part			
SMSA.....	1,740	1,567	1,505	636	869	609	260	62	155	18
Philadelphia city.....	586	534	531	461	70	60	10	3	45	7
Outside central city.....	1,154	1,033	974	175	799	549	250	59	109	11
Pennsylvania part.....	787	707	670	126	544	540	4	37	73	7
New Jersey part.....	367	327	304	49	256	10	246	22	36	4
PERCENT DISTRIBUTION										
SMSA.....	[100.0]	100.0	96.0	40.6	55.5	38.9	16.6	4.0	[8.9]	[1.0]
Philadelphia city.....	[100.0]	100.0	99.5	86.4	13.1	11.3	1.9	0.5	[7.7]	[1.2]
Outside central city.....	[100.0]	100.0	94.3	16.9	77.3	53.1	24.2	5.7	[9.5]	[0.9]
Pennsylvania part.....	[100.0]	100.0	94.8	17.8	76.9	76.4	0.6	5.2	[9.3]	[0.9]
New Jersey part.....	[100.0]	100.0	93.1	14.9	78.3	3.0	75.3	6.9	[9.8]	[1.0]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the Philadelphia SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	1,740	586	1,154	100.0	100.0	100.0
Auto or truck.....	1,329	344	986	76.4	58.7	85.4
Drives alone.....	1,054	261	793	60.6	44.5	68.7
Carpool.....	275	83	193	15.8	14.1	16.7
Public transportation.....	261	178	83	15.0	30.4	7.2
Bus or streetcar.....	153	125	28	8.8	21.3	2.4
Subway or elevated.....	54	39	16	3.1	6.6	1.3
Railroad.....	52	14	38	3.0	2.3	3.3
Taxicab.....	1	1	1	0.1	0.1	0.1
Walks only.....	99	50	50	5.7	8.5	4.3
Other means.....	16	4	12	0.9	0.7	1.0
Bicycle.....	7	2	5	0.4	0.3	0.5
Motorcycle.....	4	-	3	0.2	-	0.3
All other means.....	5	2	3	0.3	0.3	0.3
Works at home.....	35	11	24	2.0	1.8	2.1

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the Philadelphia SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thou- sands)	Percent by means of transportation						
		Total	Auto or truck		Public trans- porta- tion	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	1,740	100.0	60.6	15.8	15.0	5.7	0.9	2.0
SEX								
Male.....	1,071	100.0	66.9	14.2	11.2	4.5	1.2	2.0
Female.....	668	100.0	50.5	18.5	21.0	7.6	0.4	2.0
RACE								
White and other	1,499	100.0	63.3	15.8	12.3	5.6	0.9	2.1
Black.....	240	100.0	43.5	16.0	31.9	6.5	0.7	1.4
HOUSEHOLD RELATIONSHIP								
Head.....	1,055	100.0	65.5	13.6	13.8	4.5	0.7	2.0
Male.....	895	100.0	68.8	13.8	10.9	3.8	0.7	2.0
Female.....	159	100.0	46.7	12.7	29.8	8.5	0.3	1.9
Wife of head.....	360	100.0	54.6	20.4	15.4	7.0	0.3	2.2
Other member.....	326	100.0	51.4	17.9	18.4	8.2	2.4	1.8
EARNINGS								
Without earnings or not reported.....	158	100.0	55.5	12.8	10.1	8.5	1.4	11.8
With earnings.....	1,581	100.0	61.1	16.1	15.5	5.4	0.8	1.0
\$1 to 5,999.....	450	100.0	51.3	17.0	18.8	9.8	1.4	1.0
\$6,000 to 9,999.....	381	100.0	56.6	17.7	19.0	5.3	0.4	0.9
\$10,000 to 14,999.....	411	100.0	67.6	15.7	12.1	3.2	0.7	0.4
\$15,000 to 24,999.....	269	100.0	71.7	14.5	10.2	2.4	0.6	0.4
\$25,000 or more	70	100.0	69.6	10.8	14.5	2.0	0.7	2.4
Median earnings.....	\$9,566	...	\$10,611	\$8,920	\$7,732	\$5,793	\$6,633	\$6,851
Mean earnings.....	\$10,416	...	\$11,244	\$9,723	\$9,323	\$6,777	\$7,752	\$9,921

Table 4. Principal Means of Transportation, by Distance to Work, for the Philadelphia SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	1,550	100.0	10.0	13.3	13.8	26.0	16.9	14.3	5.1	0.6	7.0	8.7
Drives alone.....	935	100.0	5.5	13.9	15.2	28.2	17.3	14.1	5.2	0.6	7.3	9.0
Carpool.....	258	100.0	4.6	13.3	13.5	25.9	17.9	17.2	6.4	1.2	8.1	10.1
Public transportation ²	248	100.0	1.5	10.6	14.2	29.0	21.3	17.8	5.4	0.1	8.6	9.6
Bus or streetcar.....	146	100.0	2.3	16.1	19.2	31.1	15.0	12.6	3.5	-	6.5	7.8
Subway or elevated.....	53	100.0	0.2	4.2	11.5	31.5	32.1	19.6	1.1	-	9.9	9.7
Railroad.....	48	100.0	-	0.2	1.5	20.7	29.3	32.2	15.6	0.4	14.2	15.3
Walks only.....	97	100.0	87.3	11.9	0.6	-	-	-	-	-	0.1	0.2
Other means.....	13	100.0	28.0	32.0	11.2	10.4	8.8	8.8	0.8	-	1.9	4.4

¹Excludes workers with no fixed place of work and workers who worked at home.

²Includes workers using taxicabs.

Table 5. Principal Means of Transportation, by Travel Time to Work, for the Philadelphia SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	1,550	100.0	14.8	14.5	29.5	5.4	14.1	13.3	1.2	7.2	21.5	24.1
Drives alone.....	935	100.0	15.4	16.3	33.8	6.1	12.9	11.1	0.8	3.5	19.9	21.2
Carpool.....	258	100.0	10.9	15.2	30.7	5.8	16.0	14.4	1.2	5.7	22.2	24.2
Public transportation ²	248	100.0	1.2	3.0	15.9	4.2	21.0	25.9	3.1	25.8	37.3	40.9
Bus or streetcar.....	146	100.0	1.4	4.1	19.2	4.4	23.6	21.6	1.7	24.0	33.9	38.9
Subway or elevated.....	53	100.0	0.4	0.8	12.3	4.3	17.5	34.3	6.2	24.0	40.9	42.1
Railroad.....	48	100.0	0.2	1.9	9.5	3.7	17.2	30.1	4.1	33.4	43.2	46.2
Walks only.....	97	100.0	54.1	22.2	18.5	0.9	3.1	0.6	0.1	0.2	8.8	9.1
Other means.....	13	100.0	17.6	26.4	34.4	2.4	7.2	6.4	-	5.6	16.2	18.3

¹Excludes workers with no fixed place of work and workers who worked at home.

²Includes workers using taxicabs.

Appendix A—Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 14,447 housing units were eligible for interview in AHS. Of these sample units, 863 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 1,203 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 29,397 persons 14 years and older. Of these, 207 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is not 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA, a noninterview factor was computed separately for each noninterview cell.

A ratio estimation procedure was then employed for each sample housing units from the permit-issuing universe. The noninterview factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement, the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, a person ratio estimate factor was calculated for each sector.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 18,800 conventional new construction units and 2,200 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and

nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 through A-4 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These estimates

of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 668,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 8,706. Consequently, the 68-percent confidence interval, as shown by these data, is from 659,294 to 676,706. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 654,070 to 681,930 workers with 90-percent confidence and within the interval from 650,588 to 685,412 with 95-percent confidence.

Table 3 also shows that of the 668,000 female workers, 21.0 percent commuted by means of public transportation. Interpolation in table A-2 of the appendix shows that the standard error of the percent is approximately 0.6 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 20.4 to 21.6 percent; the 90-percent confidence interval is from 20.0 to 22.0 percent; and the 95-percent confidence interval is from 19.8 to 22.2 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 11.2 percent of the male workers in this SMSA commuted by means of public transportation. Thus, the apparent difference, as shown by these data, between the percentage of public transportation use by males and females is 9.8 percent. Table A-2 of the appendix shows the standard error of 11.2 percent on a base of 1,071,000 is approximately 0.4, while the standard error of 21.0 percent is approximately 0.6 percent. Therefore, the standard error of the estimated difference of 9.8 percent is about

$$0.7 = \sqrt{(0.4)^2 + (0.6)^2}$$

Consequently, the 68-percent confidence interval for the 9.8 percent difference is from 9.1 to 10.5 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 8.7 to 10.9 percent, and the 95-percent confidence interval is from 8.4 to 11.2 percent. Thus, we can conclude with 95-percent confidence that the percentage of female workers who used public transportation in 1975 is greater than the percentage of male workers who used transit, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

1. Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.
2. Add to and subtract from 50 percent the standard error determined in step 1.
3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 19.9 minutes.

1. Using table A-2 of the appendix, the standard error of 50 percent on a base of 935,000 is found to be about 0.6 percent.
2. A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 48.8 and 51.2.
3. The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 31.7 percent of the persons fall in the intervals below the median interval, while 33.8 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{48.8 - 31.7}{33.8} \right) = 19.6$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{51.2 - 31.7}{33.8} \right) = 20.3$$

Thus, the 95-percent confidence interval on the estimated median is from 19.6 to 20.3 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} S^2}$$

where y is the size of the base, and b is a parameter which equals 145.5 for this SMSA, 105.8 for the central city, and 169.8 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c p_i \bar{X}_i^2 - \left(\sum_{i=1}^c p_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for group i ; and $\bar{x}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{x}_c = \frac{3}{2} Z_{c-1}.$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 21.2 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min.	.154	4.5
10 to 14 min.	.163	12.0
15 to 24 min.	.338	19.5
25 to 29 min.	.061	27.0
30 to 34 min.	.129	32.0
35 to 49 min.	.111	42.0
50 to 59 min.	.008	54.5
60 min. or more	.035	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 293.6$$

The b parameter is equal to 145.5. Thus the standard error on 21.2 minutes, $\sigma_{\bar{x}}$ is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{145.5}{935,000} (293.6)} = 0.2 \text{ minutes.}$$

Consequently, the 68-percent confidence interval is estimated to be from 21.0 to 21.4 minutes, the 90-percent confidence interval is from 20.9 to 21.5 minutes, and the 95-percent confidence interval is from 20.8 to 21.6 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the Philadelphia, Pa.-N.J. SMSA, in the Central City of the SMSA and in the Balance of the SMSA

(68 chances out of 100)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	150	110	170	75,000.....	3,270	2,740	3,510
100.....	150	110	170	100,000.....	3,760	3,130	4,030
200.....	170	150	180	150,000.....	4,570	3,760	4,870
500.....	270	230	290	250,000.....	5,820	4,660	6,140
700.....	320	270	340	500,000.....	7,920	5,820	8,110
1,000.....	380	330	410	1,000,000.....	10,260	5,450	9,650
2,500.....	600	510	650	1,200,000.....	10,800	4,170	9,670
5,000.....	850	730	920	2,000,000.....	11,390	-	5,750
10,000.....	1,200	1,020	1,300	2,500,000.....	10,570	-	-
25,000.....	1,900	1,610	2,050	3,000,000.....	8,570	-	-
50,000.....	2,680	2,260	2,880	3,500,000.....	3,880	-	-

Table A-2. Standard Errors for Estimated Percentage of Workers in the Philadelphia, Pa.-N.J. SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	59.3	59.3	59.3	59.3	59.3	60.3
200.....	42.1	42.1	42.1	42.1	42.1	42.7
500.....	22.5	22.5	22.5	22.5	23.4	27.0
700.....	17.2	17.2	17.2	17.2	19.7	22.8
1,000.....	12.7	12.7	12.7	12.7	16.5	19.1
2,500.....	5.5	5.5	5.5	7.2	10.4	12.1
5,000.....	2.8	2.8	3.7	5.1	7.4	8.5
10,000.....	1.4	1.4	2.6	3.6	5.2	6.0
25,000.....	0.6	0.8	1.7	2.3	3.3	3.8
50,000.....	0.3	0.5	1.2	1.6	2.3	2.7
75,000.....	0.2	0.4	1.0	1.3	1.9	2.2
100,000.....	0.15	0.4	0.8	1.1	1.7	1.9
150,000.....	0.10	0.3	0.7	0.9	1.3	1.6
250,000.....	0.06	0.2	0.5	0.7	1.0	1.2
500,000.....	0.03	0.2	0.4	0.5	0.7	0.9
1,000,000.....	0.01	0.12	0.3	0.4	0.5	0.6
1,200,000.....	0.01	0.11	0.2	0.3	0.5	0.6
2,000,000.....	0.01	0.08	0.2	0.3	0.4	0.4
2,500,000.....	0.01	0.08	0.2	0.2	0.3	0.4
3,000,000.....	0.01	0.07	0.15	0.2	0.3	0.3
3,500,000.....	0.01	0.06	0.14	0.2	0.3	0.3

Table A-3. Standard Errors for Estimated Percentage of Workers in the Central City of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	51.4	51.4	51.4	51.4	51.4	51.4
200.....	34.6	34.6	34.6	34.6	34.6	36.4
500.....	17.5	17.5	17.5	17.5	19.9	23.0
700.....	13.1	13.1	13.1	13.1	16.8	19.4
1,000.....	9.6	9.6	9.6	9.8	14.1	16.3
2,500.....	4.1	4.1	4.5	6.2	8.9	10.3
5,000.....	2.1	2.1	3.2	4.4	6.3	7.3
10,000.....	1.0	1.0	2.2	3.1	4.5	5.1
25,000.....	0.4	0.6	1.4	2.0	2.8	3.3
50,000.....	0.2	0.5	1.0	1.4	2.0	2.3
75,000.....	0.14	0.4	0.8	1.1	1.6	1.9
100,000.....	0.11	0.3	0.7	1.0	1.4	1.6
150,000.....	0.07	0.3	0.6	0.8	1.2	1.3
250,000.....	0.04	0.2	0.4	0.6	0.9	1.0
500,000.....	0.02	0.14	0.3	0.4	0.6	0.7
1,000,000.....	0.01	0.10	0.2	0.3	0.4	0.5
1,200,000.....	0.01	0.09	0.2	0.3	0.4	0.5

Table A-4. Standard Errors for Estimated Percentage of Workers in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
200.....	45.9	45.9	45.9	45.9	45.9	46.1
500.....	25.4	25.4	25.4	25.4	25.4	29.1
700.....	19.5	19.5	19.5	19.5	21.3	24.6
1,000.....	14.5	14.5	14.5	14.5	17.8	20.6
2,500.....	6.4	6.4	6.4	7.8	11.3	13.0
5,000.....	3.3	3.3	4.0	5.5	8.0	9.2
10,000.....	1.7	1.7	2.8	3.9	5.6	6.5
25,000.....	0.7	0.8	1.8	2.5	3.6	4.1
50,000.....	0.3	0.6	1.3	1.7	2.5	2.9
75,000.....	0.2	0.5	1.0	1.4	2.1	2.4
100,000.....	0.2	0.4	0.9	1.2	1.8	2.1
150,000.....	0.11	0.3	0.7	1.0	1.5	1.7
250,000.....	0.07	0.3	0.6	0.8	1.1	1.3
500,000.....	0.03	0.2	0.4	0.6	0.8	0.9
1,000,000.....	0.02	0.13	0.3	0.4	0.6	0.7
1,200,000.....	0.01	0.12	0.3	0.4	0.5	0.6
2,000,000.....	0.01	0.09	0.2	0.3	0.4	0.5

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person

240

Line number of respondent

241

242

1 ☐ Truck

2 ☐ Car or carpool } →

243

1 ☐ Drives alone – Skip to 8a

2 ☐ Shares driving

3 ☐ Drives others

4 ☐ Rides with someone else } Skip to 7c

5 ☐ Walks only – Skip to 8a

6 ☐ Works at home – Skip to 12a

7 ☐ Railroad

8 ☐ Subway or elevated

9 ☐ Bus or streetcar

10 ☐ Taxicab

11 ☐ Motorcycle

13 ☐ Bicycle

12 ☐ Other means – Specify _____

b. Does . . . usually ALSO use a car for part of the trip to work?

244

1 ☐ Yes

2 ☐ No – Skip to 8a

c. How many people, including . . . , usually ride in the car to work?

245

_____ Number

8a. Does . . . usually WORK at the same location each day?

246

1 ☐ Yes – Skip to 8c

2 ☐ No

b. Does . . . usually REPORT to the same location to begin work each day?

247

3 ☐ Yes

4 ☐ No – Skip to 12a

c. Where is . . . 's usual place of work?

(1) Company or business establishment name

(2) Address (Number and street)

Note – If address (number and street name) are not known, enter building name, shopping center name, or other physical location description.

(3) Names of nearest intersecting streets

(4) Name of city, town, village, borough, etc.

(5) County

State

ZIP code

If last worker in this household, mark this box →

8d. Was . . . 's place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c(4))?

248

1 ☐ Yes

2 ☐ No

3 ☐ Don't know

9. What time does . . . usually leave for work?

249

_____ Time

250

1 ☐ a.m.

2 ☐ p.m.

10. How long does it usually take . . . to get from home to work?

251

_____ Minutes

11. What is . . . 's ONE-WAY distance from home to work?

252

_____ Miles

OR

0 ☐ Less than 1 mile

12a. In the last year, has . . . changed his principal means of transportation to work?

253

1 ☐ Yes

2 ☐ No – Skip to 13

b. What was . . . 's principal means of transportation to work (prior to the change)?

254

1 ☐ Truck

2 ☐ Car or carpool } →

255

1 ☐ Drove alone

2 ☐ Shared driving

3 ☐ Drove others

4 ☐ Rode with someone else

5 ☐ Walked only

6 ☐ Worked at home

7 ☐ Railroad

8 ☐ Subway or elevated

9 ☐ Bus or streetcar

10 ☐ Taxicab

11 ☐ Motorcycle

13 ☐ Bicycle

12 ☐ Other means – Specify _____

13. If "Yes" marked in 12a – ASK Compared to . . . 's previous means of transportation to work (Given in 12b), how satisfied is . . . with his present means of transportation to work – much more, more, about the same, less or much less satisfied?

256

1 ☐ Much more satisfied

2 ☐ More satisfied

3 ☐ About the same satisfaction

4 ☐ Less satisfied

5 ☐ Much less satisfied

6 ☐ Don't know

7 ☐ Did not work last year

If "No" marked in 12a – ASK Compared to a year ago, how satisfied is . . . now with his principal means of transportation to work – much more, more, about the same, less or much less satisfied?

Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a–e on page 19 of AHS-52 questionnaire.

INTERVIEWER

Appendix C—Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker usually carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it usually take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "-" means "rounds to or represents zero." Three dots "..." means "not applicable."

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Series P-23, No. 87
Issued August 1979

Selected Characteristics of Travel to Work in the Chicago SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the Chicago SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the SMSA in 1975, about 1,043,000 workers, was comprised of persons who both lived and worked in the suburbs (table 1). In comparison, only about 338,000 workers who lived in the suburbs commuted into Chicago to work. Approximately 845,000 of the workers who lived in Chicago also worked there, while 170,000 workers made the reverse trip from the city to suburban employment.

MEANS OF TRANSPORTATION TO WORK

Of the more than 2.6 million workers living in the Chicago SMSA in 1975, the survey results show that the majority (58 percent) usually drove to work alone (table 2). The proportion who used public transportation to get to work (18 percent) was slightly larger than the proportion who used carpools (17 percent), while 5 percent walked, 1 percent worked at home, and 1 percent used other means. Workers who lived in the suburbs were more likely to drive alone to work (68 percent) than residents of the city (44 percent),

while workers who lived in Chicago were more likely to use public transportation (31 percent) than suburban residents (10 percent).

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were more likely than men to carpool or use public transportation (table 3).

Race. Black workers showed a lower incidence of driving alone (47 percent) than White¹ workers (60 percent), and a correspondingly higher incidence of using public transportation (32 percent compared with 16 percent). The proportion of Blacks and Whites who traveled in carpools was not significantly different (table 3).

Household relationship. Female household heads were less likely to drive alone to work and more likely to use public transportation than male household heads in 1975 (table 3). Comparing working wives with female household heads, the data indicate that the wives were more likely to carpool, and less likely to use public transit than female heads of households. Thirty-one percent of the female heads used public transportation compared with 18 percent of the working wives.

Earnings. Comparing the three most widely used means of transportation, workers who drove alone to work had the highest median earnings (\$11,484), while the difference in median earnings between workers in carpools (\$8,924) and public transportation users (\$8,997) was not significant (table 3).

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was 9 miles in 1975 (table 4). Workers who used public transportation to get to work reported traveling slightly farther (12 miles), on the average, than workers who drove alone (9 miles) or carpooled (10 miles).

Travel time by means of transportation. The average commuting trip in the SMSA took 26 minutes in 1975 (table 5). Workers who drove alone reported an average of 23 minutes to get to work, compared with 25 minutes for those who carpooled. Public transportation users spent an average of 44 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 14,442 sample households in the Chicago SMSA were eligible to answer the inquiries contained in the Travel-to-Work Supplement. The

interviews resulted in responses from 28,802 workers 14 years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)

Albany-Schenectady-Troy, N.Y.
Anaheim-Santa Ana-Garden Grove,
Calif.
Boston, Mass.*
Dallas, Tex.
Detroit, Mich.*
Fort Worth, Tex.
Los Angeles-Long Beach, Calif.*
Madison, Wis.†
Memphis, Tenn.-Ark.
Minneapolis-St. Paul, Minn.
Newark, N.J.
Orlando, Fla.
Phoenix, Ariz.
Pittsburgh, Pa.
Saginaw, Mich.
Salt Lake City, Utah
Spokane, Wash.
Tacoma, Wash.
Washington, D.C.-Md.-Va.*
Wichita, Kans.

SURVEY GROUP II (1975 to 1976)

Atlanta, Ga.*
Chicago, Ill.*
Cincinnati, Ohio-Ky.-Ind.
Colorado Springs, Colo.
Columbus, Ohio
Hartford, Conn.
Kansas City, Mo.-Kans.
Miami, Fla.
Milwaukee, Wis.
New Orleans, La.
Newport News-Hampton, Va.
Paterson-Clifton-Passaic, N.J.
Philadelphia, Pa.-N.J.*
Portland, Oreg.-Wash.
Rochester, N.Y.
San Antonio, Tex.
San Bernardino-Riverside-Ontario,
Calif.
San Diego, Calif.
San Francisco-Oakland, Calif.*
Springfield-Chicopee-Holyoke,
Mass.-Conn.

SURVEY GROUP III (1976 to 1977)

Allentown-Bethlehem-Easton, Pa.-N.J.
Baltimore, Md.
Birmingham, Ala.
Buffalo, N.Y.
Cleveland, Ohio
Denver, Colo.
Grand Rapids, Mich.
Honolulu, Hawaii
Houston, Tex.*
Indianapolis, Ind.
Las Vegas, Nev.
Louisville, Ky.-Ind.
New York, N.Y.*
Oklahoma City, Okla.
Omaha, Nebr.-Iowa
Providence-Pawtucket-Warwick, R.I.-
Mass.
Raleigh, N.C.
Sacramento, Calif.
St. Louis, Mo.-Ill.*
Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group I are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the Chicago SMSA

Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

For explanation of symbols, see text)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside the SMSA			Outside the SMSA		
			Total	Chicago city	Outside central city			
SMSA.....	2,687	2,425	2,396	1,183	1,213	29	233	28
Chicago city.....	1,096	1,019	1,015	845	170	4	64	14
Outside central city.....	1,590	1,406	1,381	338	1,043	26	170	15
PERCENT DISTRIBUTION								
SMSA.....	[100.0]	100.0	98.8	48.8	50.0	1.2	[8.7]	[1.0]
Chicago city.....	[100.0]	100.0	99.6	82.9	16.7	0.4	[5.8]	[1.2]
Outside central city.....	[100.0]	100.0	98.2	24.0	74.2	1.8	[10.7]	[0.9]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the Chicago SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	2,687	1,096	1,590	100.0	100.0	100.0
Auto or truck.....	2,004	663	1,340	74.6	60.5	84.3
Drives alone.....	1,555	481	1,074	57.9	43.9	67.5
Carpool.....	448	182	266	16.7	16.6	16.7
Public transportation.....	488	335	154	18.2	30.5	9.7
Bus or streetcar.....	255	231	24	9.5	21.1	1.5
Subway or elevated.....	106	87	19	3.9	8.0	1.2
Railroad.....	122	13	109	4.6	1.2	6.9
Taxicab.....	5	3	2	0.2	0.3	0.1
Walks only.....	144	80	64	5.3	7.3	4.0
Other means.....	18	6	11	0.7	0.6	0.7
Bicycle.....	11	4	7	0.4	0.4	0.5
Motorcycle.....	2	1	1	0.1	-	0.1
All other means.....	4	2	3	0.2	0.1	0.2
Works at home.....	34	12	22	1.3	1.1	1.4

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the Chicago SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

(Workers 14 years old and over SMSA as of the 1970 census: 101,549)								
Characteristics	All workers (thou- sands)	Percent by means of transportation						Works at home
		Total	Auto or truck		Public trans- porta- tion	Walks only	Other means	
			Drives alone	Carpool				
All workers.....	2,687	100.0	57.9	16.7	18.2	5.3	0.7	1.3
SEX								
Male.....	1,626	100.0	65.0	14.4	14.5	4.0	0.8	1.2
Female.....	1,060	100.0	46.9	20.2	23.7	7.4	0.4	1.7
RACE								
White and other	2,339	100.0	59.5	16.6	16.2	5.7	0.7	1.2
Black.....	348	100.0	46.8	17.4	31.8	2.9	0.5	0.8
HOUSEHOLD RELATIONSHIP								
Head.....	1,616	100.0	63.1	13.6	17.9	3.7	0.5	1.2
Male.....	1,359	100.0	66.6	13.9	14.6	3.0	0.6	1.2
Female.....	258	100.0	52.1	10.2	30.5	6.1	0.3	0.8
Wife of head.....	563	100.0	50.2	23.4	17.5	6.9	0.2	1.2
Other member.....	507	100.0	49.9	19.0	20.0	9.0	1.5	0.8
EARNINGS								
Without earnings or not reported.....	217	100.0	48.2	18.7	14.9	8.9	1.2	8.0
With earnings.....	2,470	100.0	58.7	16.5	18.5	5.0	0.6	0.0
\$1 to 5,999.....	645	100.0	47.9	19.3	20.5	9.8	1.3	1.0
\$6,000 to 9,999.....	564	100.0	51.8	19.0	22.8	5.6	0.4	0.0
\$10,000 to 14,999.....	622	100.0	65.4	14.9	15.8	2.9	0.5	0.0
\$15,000 to 24,999.....	507	100.0	70.2	13.8	13.7	1.7	0.3	0.0
\$25,000 or more	132	100.0	66.2	9.7	20.7	2.1	0.2	1.0
Median earnings.....	\$10,185	...	\$11,484	\$8,924	\$8,997	\$5,857	\$5,034	\$6,230
Mean earnings.....	\$11,079	...	\$12,015	\$9,806	\$10,579	\$6,922	\$6,718	\$9,230

Table 4. Principal Means of Transportation, by Distance to Work, for the Chicago SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	2,419	100.0	9.7	13.3	13.6	24.5	16.2	14.4	7.7	0.5	7.2	9.3
Drives alone.....	1,370	100.0	5.6	13.7	15.4	27.2	16.1	14.1	7.1	0.6	7.3	9.4
Carpool.....	424	100.0	4.9	16.3	12.2	23.7	18.3	16.0	8.0	0.5	8.0	10.0
Public transportation ²	471	100.0	1.7	9.5	13.6	25.4	19.5	18.4	11.9	0.1	9.5	11.5
Bus or streetcar.....	246	100.0	3.0	16.3	21.5	30.2	17.5	9.9	1.7	-	6.0	7.1
Subway or elevated.....	102	100.0	0.2	2.2	8.6	38.4	31.3	18.1	1.1	-	9.6	10.0
Railroad.....	118	100.0	-	0.6	0.8	4.5	13.9	36.9	42.9	0.4	22.7	22.2
Walks only.....	141	100.0	88.7	11.2	-	0.1	-	-	-	-	0.1	0.1
Other means.....	15	100.0	31.5	37.0	21.9	1.4	3.4	4.8	-	-	1.5	2.5

¹Excludes workers with no fixed place of work and workers who worked at home.²Includes workers using taxicabs.**Table 5. Principal Means of Transportation, by Travel Time to Work, for the Chicago SMSA**

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	2,419	100.0	14.0	13.1	26.7	5.2	13.7	15.3	1.7	10.3	23.1	26.4
Drives alone.....	1,370	100.0	14.5	15.2	31.6	6.0	13.6	13.1	1.0	5.0	20.9	22.6
Carpool.....	424	100.0	13.4	13.6	27.7	5.9	14.3	16.0	1.9	7.2	22.8	25.0
Public transportation ²	471	100.0	1.1	3.0	13.4	3.9	17.1	25.8	4.0	31.8	41.2	43.9
Bus or streetcar.....	246	100.0	1.7	5.0	19.6	4.5	21.4	23.2	3.0	21.6	34.0	37.6
Subway or elevated.....	102	100.0	0.4	0.4	10.9	4.2	20.5	38.5	3.4	21.8	39.8	41.7
Railroad.....	118	100.0	0.2	0.3	1.7	2.3	5.4	21.0	6.7	62.6	63.1	59.7
Walks only.....	141	100.0	52.8	23.9	19.5	0.5	2.3	0.5	-	0.4	9.0	9.0
Other means.....	15	100.0	26.7	19.9	37.7	-	8.2	3.4	-	3.4	15.4	17.0

¹Excludes workers with no fixed place of work and workers who worked at home.²Includes workers using taxicabs.

Appendix A—Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 14,447 housing units were eligible for interview in AHS. Of these sample units, 863 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 1,203 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 29,397 persons 14 years and older. Of these, 207 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is not 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{Weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA a noninterview factor was computed separately for 5 noninterview cells.

A ratio estimation procedure was then employed for a sample housing units from the permit-issuing universe. The factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement, the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, a person ratio estimate factor was calculated for each sector.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 18,800 conventional new construction units and 2,200 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the

accuracy of the estimates depends on both the sampling and nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 and A-2 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of

standard errors for estimates of zero and zero percent. These estimates of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 1,060,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 13,662. Consequently, the 68-percent confidence interval, as shown by these data, is from 1,046,338 to 1,073,662. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 1,038,141 to 1,081,859 workers with 90-percent confidence and within the interval from 1,032,676 to 1,087,324 with 95-percent confidence.

Table 3 also shows that of the 1,060,000 female workers, 23.7 percent commuted by means of public transportation. Interpolation in table A-2 of the appendix shows that the standard error of the percent is approximately 0.6 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 23.1 to 24.3 percent; the 90-percent confidence interval is from 22.7 to 24.7 percent; and the 95-percent confidence interval is from 22.5 to 24.9 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 14.5 percent of the male workers in this SMSA commuted by means of public transportation. Thus, the apparent difference, as shown by these data, between the percentage of public transportation use by males and females is 9.2 percent. Table A-2 of the appendix shows the standard error of 14.5 percent on a base of 1,626,000 is approximately 0.4, while the standard error of 23.7 percent is approximately 0.6 percent. Therefore, the standard error of the estimated difference of 9.2 percent is about

$$0.7 = \sqrt{(0.4)^2 + (0.6)^2}$$

Consequently, the 68-percent confidence interval for the 9.2-percent difference is from 8.5 to 9.9 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 8.1 to 10.3 percent, and the 95-percent confidence interval is from 7.8 to 10.6 percent. Thus, we can conclude with 95-percent confidence that the percentage of female workers who used public transportation in 1975 is greater than the percentage of male workers who used transit, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.

Add to and subtract from 50 percent the standard error determined in step 1.

Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 20.9 minutes.

Using table A-2 of the appendix, the standard error of 50 percent on a base of 1,370,000 is found to be about 0.6 percent.

A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields 95-percent limits 48.8 and 51.2.

The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 29.7 percent of the persons fall in the intervals below the median interval, while 31.6 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \cdot \left(\frac{48.8 - 29.7}{31.6} \right) = 20.5$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \cdot \left(\frac{51.2 - 29.7}{31.6} \right) = 21.3$$

Thus, the 95-percent confidence interval on the estimated median is from 20.5 to 21.3 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} S^2}$$

where y is the size of the base, and b is a parameter which equals 222.7 for this SMSA, 196.9 for the central city, and 228.5 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for

group i ; and $\bar{X}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{X}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 22.6 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min.	.145	4.5
10 to 14 min.	.152	12.0
15 to 24 min.	.316	19.5
25 to 29 min.	.060	27.0
30 to 34 min.	.136	32.0
35 to 49 min.	.131	42.0
50 to 59 min.	.010	54.5
60 min. or more	.050	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 360.9$$

The b parameter is equal to 222.7. Thus the standard error on 22.6 minutes, $\sigma_{\bar{x}}$, is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{222.7}{1,370,000} (360.9)} = 0.2 \text{ minutes.}$$

Consequently, the 68-percent confidence interval is estimated to be from 22.4 to 22.8 minutes, the 90-percent confidence interval is from 22.3 to 22.9 minutes, and the 95-percent confidence interval is from 22.2 to 23.0 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the Chicago, Ill. SMSA, in the Central City of the SMSA and in the Balance of the SMSA
(68 chances out of 100)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	220	200	230	150,000.....	5,700	5,260	5,700
200.....	220	200	230	250,000.....	7,280	6,630	7,220
500.....	330	310	340	500,000.....	10,030	8,810	9,700
700.....	390	370	400	1,000,000.....	13,410	10,640	12,170
1,000.....	470	440	480	1,400,000.....	15,090	10,570	12,740
2,500.....	750	700	760	2,000,000.....	16,550	7,690	11,630
5,000.....	1,050	990	1,070	2,250,000.....	16,850	4,420	10,340
10,000.....	1,490	1,400	1,510	2,500,000.....	17,000	-	8,280
25,000.....	2,350	2,210	2,380	3,500,000.....	15,950	-	-
50,000.....	3,320	3,100	3,350	4,500,000.....	11,580	-	-
75,000.....	4,060	3,780	4,080	5,000,000.....	6,470	-	-
100,000.....	4,670	4,340	4,690				

Table A-2. Standard Errors for Estimated Percentage of Workers in the Chicago, Ill. SMSA, in the Central City of the SMSA and in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
200.....	52.7	52.7	52.7	52.7	52.7	52.8
500.....	30.8	30.8	30.8	30.8	30.8	33.4
700.....	24.1	24.1	24.1	24.1	24.4	28.2
1,000.....	18.2	18.2	18.2	18.2	20.4	23.6
2,500.....	8.2	8.2	8.2	9.0	12.9	14.9
5,000.....	4.3	4.3	4.6	6.3	9.1	10.6
10,000.....	2.2	2.2	3.3	4.5	6.5	7.5
25,000.....	0.9	0.9	2.1	2.8	4.1	4.7
50,000.....	0.4	0.7	1.5	2.0	2.9	3.3
75,000.....	0.3	0.5	1.2	1.6	2.4	2.7
100,000.....	0.2	0.5	1.0	1.4	2.0	2.4
150,000.....	0.15	0.4	0.8	1.2	1.7	1.9
250,000.....	0.09	0.3	0.7	0.9	1.3	1.5
500,000.....	0.04	0.2	0.5	0.6	0.9	1.1
1,000,000.....	0.02	0.15	0.3	0.4	0.6	0.7
1,400,000.....	0.02	0.13	0.3	0.4	0.5	0.6
2,000,000.....	0.01	0.10	0.2	0.3	0.5	0.5
2,250,000.....	0.01	0.10	0.2	0.3	0.4	0.5
2,500,000.....	0.01	0.09	0.2	0.3	0.4	0.5
3,500,000.....	0.01	0.08	0.2	0.2	0.3	0.4
4,500,000.....	0.01	0.07	0.2	0.2	0.3	0.4
5,000,000.....	0.01	0.07	0.15	0.2	0.3	0.3

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person		Line number of respondent		If last worker in this household, mark this box
	(240)		(241)	_____ <input type="checkbox"/>
7a. What is ...'s principal means of transportation to work?				
(242)	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <input type="checkbox"/> Truck <input type="checkbox"/> Car or carpool } </div> <div style="font-size: 2em;">}</div> <div style="margin-left: 10px;">→</div> </div>			
(243)	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <input type="checkbox"/> Drives alone – Skip to 8a <input type="checkbox"/> Shares driving <input type="checkbox"/> Drives others <input type="checkbox"/> Rides with someone else } </div> <div style="font-size: 2em;">}</div> <div style="margin-left: 10px;">Skip to 7c</div> </div>			
	<input type="checkbox"/> Walks only – Skip to 8a <input type="checkbox"/> Works at home – Skip to 12a <input type="checkbox"/> Railroad <input type="checkbox"/> Subway or elevated <input type="checkbox"/> Bus or streetcar <input type="checkbox"/> Taxicab <input type="checkbox"/> Motorcycle <input type="checkbox"/> Bicycle <input type="checkbox"/> Other means – Specify _____			
b. Does ... usually ALSO use a car for part of the trip to work?				
(244)	<input type="checkbox"/> Yes <input type="checkbox"/> No – Skip to 8a			
c. How many people, including ..., usually ride in the car to work?				
(245)	_____ Number			
8a. Does ... usually WORK at the same location each day?				
(246)	<input type="checkbox"/> Yes – Skip to 8c <input type="checkbox"/> No			
b. Does ... usually REPORT to the same location to begin work each day?				
(247)	<input type="checkbox"/> Yes <input type="checkbox"/> No – Skip to 12a			
c. Where is ...'s usual place of work?				
(1) Company or business establishment name				

(2) Address (Number and street)				
Note – If address (number and street name) are not known, enter building name, shopping center name, or other physical location description.				

(3) Names of nearest intersecting streets				

(4) Name of city, town, village, borough, etc.				

<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">Place type →</div> <div style="margin-left: 10px;">_____</div> </div>				
(5) County				

State ZIP code				

8d. Was ...'s place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c(4)?				
(248)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know			
9. What time does ... usually leave for work?				
(249)	_____ Time			
(250)	<input type="checkbox"/> a.m. <input type="checkbox"/> p.m.			
10. How long does it usually take ... to get from home to work?				
(251)	_____ Minutes			
11. What is ...'s ONE-WAY distance from home to work?				
(252)	_____ Miles OR <input type="checkbox"/> Less than 1 mile			
12a. In the last year, has ... changed his principal means of transportation to work?				
(253)	<input type="checkbox"/> Yes <input type="checkbox"/> No – Skip to 13			
b. What was ...'s principal means of transportation to work (prior to the change)?				
(254)	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <input type="checkbox"/> Truck <input type="checkbox"/> Car or carpool } </div> <div style="font-size: 2em;">}</div> <div style="margin-left: 10px;">→</div> </div>			
(255)	<input type="checkbox"/> Drove alone <input type="checkbox"/> Shared driving <input type="checkbox"/> Drove others <input type="checkbox"/> Rode with someone else <input type="checkbox"/> Walked only <input type="checkbox"/> Worked at home <input type="checkbox"/> Railroad <input type="checkbox"/> Subway or elevated <input type="checkbox"/> Bus or streetcar <input type="checkbox"/> Taxicab <input type="checkbox"/> Motorcycle <input type="checkbox"/> Bicycle <input type="checkbox"/> Other means – Specify _____			
13. If "Yes" marked in 12a – ASK Compared to ...'s previous means of transportation to work (Given in 12b), how satisfied is ... with his present means of transportation to work – much more, more, about the same, less or much less satisfied?				
(256)	<input type="checkbox"/> Much more satisfied <input type="checkbox"/> More satisfied <input type="checkbox"/> About the same satisfaction <input type="checkbox"/> Less satisfied <input type="checkbox"/> Much less satisfied <input type="checkbox"/> Don't know <input type="checkbox"/> Did not work last year			
If "No" marked in 12a – ASK Compared to a year ago, how satisfied is ... now with his principal means of transportation to work – much more, more, about the same, less or much less satisfied?				
<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> INTERVIEWER </div> <div> Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a–e on page 19 of AHS-52 questionnaire. </div> </div>				

Appendix C—Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker usually carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it usually take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

- . The largest city in an SMSA is always a central city.
- . One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "-" means "rounds to or represents zero." Three dots "..." means "not applicable."

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U.S. Department of Commerce
BUREAU OF THE CENSUS

Series P-23, No. 88
Issued July 1979

Selected Characteristics of Travel to Work in the San Francisco-Oakland SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the San Francisco-Oakland SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the SMSA in 1975, about 35,000 workers, was comprised of persons who both lived and worked in the suburbs (table 1). In comparison, about 38,000 workers who lived in the suburbs commuted into San Francisco, and 77,000 commuted into Oakland. Approximately 219,000 of the workers who lived in San Francisco also worked there, while 22,000 workers lived in the city and worked in the suburbs. Among Oakland residents, 63,000 worked in Oakland, 32,000 in the suburbs, and 12,000 commuted into San Francisco. About 1 percent of the workers living in each central city worked outside the SMSA, compared with 5 percent of those living in the suburbs.

MEANS OF TRANSPORTATION TO WORK

Of the more than 1.2 million workers living in the San Francisco-Oakland SMSA in 1975, the survey results show that the majority (61 percent) usually drove to work alone (table 2). The proportion who used public transportation to get to work (16 percent) was slightly larger than the proportion who used carpools (14 percent), while 5 percent

walked, 2 percent worked at home, and 2 percent used other means. Workers who lived in the suburbs were more likely to drive alone to work (68 percent) than residents of the central cities (45 percent), while workers who lived in the central cities were more likely to use public transportation (30 percent) than suburban residents (9 percent).

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were more likely than men to use public transportation (table 3). The difference between male and female workers in the rate of carpooling was not significant.

Race. Black workers showed a higher incidence of using public transportation (21 percent) than White¹ workers (15 percent). However, the differences in the proportions of Blacks and Whites who either drove alone or traveled in carpools were not significant (table 3).

Household relationship. Female household heads were less likely to either drive alone or carpool to work, and more likely to use public transportation than male household heads in 1975 (table 3). Comparing working wives with female household heads, the data indicate that the wives were more likely to carpool and less likely to use public transit than female heads of households. Twenty-six percent of the female heads used public transportation compared with 16 percent of the working wives.

Earnings. Comparing the three most widely used means of transportation, workers who drove alone to work had the highest median earnings (\$11,324), followed by those in carpools (\$10,378), and users of public transit (\$9,024).

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was 10 miles in 1975 (table 4). Workers who used carpools to get to work reported traveling farther (13 miles), on the average, than workers who drove alone (10 miles) or rode public transportation (10 miles).

Travel time by means of transportation. The average commuting trip in the SMSA took 23 minutes in 1975 (table 5). Workers who drove alone reported an average of 20 minutes to get to work, compared with 25 minutes for those who carpooled. Public transportation users spent an average of 37 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 14,523 sample households in the San Francisco-Oakland SMSA were eligible to answer the inquiries contained in the Travel-to-Work Supplement. The interviews resulted in responses from

25,776 workers 14 years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See list of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)	SURVEY GROUP II (1975 to 1976)	SURVEY GROUP III (1976 to 1977)
Albany-Schenectady-Troy, N.Y.	Atlanta, Ga.*	Allentown-Bethlehem-Easton, Pa.-N.J.
Anaheim-Santa Ana-Garden Grove, Calif.	Chicago, Ill.*	Baltimore, Md.
Boston, Mass.*	Cincinnati, Ohio-Ky.-Ind.	Birmingham, Ala.
Dallas, Tex.	Colorado Springs, Colo.	Buffalo, N.Y.
Detroit, Mich.*	Columbus, Ohio	Cleveland, Ohio
Fort Worth, Tex.	Hartford, Conn.	Denver, Colo.
Los Angeles-Long Beach, Calif.*	Kansas City, Mo.-Kans.	Grand Rapids, Mich.
Madison, Wis.†	Miami, Fla.	Honolulu, Hawaii
Memphis, Tenn.-Ark.	Milwaukee, Wis.	Houston, Tex.*
Minneapolis-St. Paul, Minn.	New Orleans, La.	Indianapolis, Ind.
Newark, N.J.	Newport News-Hampton, Va.	Las Vegas, Nev.
Orlando, Fla.	Paterson-Clifton-Passaic, N.J.	Louisville, Ky.-Ind.
Phoenix, Ariz.	Philadelphia, Pa.-N.J.*	New York, N.Y.*
Pittsburgh, Pa.	Portland, Oreg.-Wash.	Oklahoma City, Okla.
Saginaw, Mich.	Rochester, N.Y.	Omaha, Nebr.-Iowa
Salt Lake City, Utah	San Antonio, Tex.	Providence-Pawtucket-Warwick, R.I.- Mass.
Spokane, Wash.	San Bernardino-Riverside-Ontario, Calif.	Raleigh, N.C.
Tacoma, Wash.	San Diego, Calif.	Sacramento, Calif.
Washington, D.C.-Md.-Va.*	San Francisco-Oakland, Calif.*	St. Louis, Mo.-Ill.*
Wichita, Kans.	Springfield-Chicopee-Holyoke, Mass.-Conn.	Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group I are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the San Francisco-Oakland SMSA

Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Place of residence	All workers	Reported a fixed place of work							No fixed place of work	Place of work not reported
		Total	Inside the SMSA					Outside the SMSA		
			Total	Inside central cities			Outside central cities			
				Total	San Francisco city	Oakland city				
SMSA.....	1,278	1,148	1,102	513	370	144	589	46	120	10
entral cities.....	392	355	352	298	232	67	54	3	32	4
San Francisco city.....	273	248	245	223	219	4	22	2	22	2
Oakland city.....	119	108	107	75	12	63	32	1	10	2
utside central cities.....	887	792	750	215	138	77	535	42	88	7
PERCENT DISTRIBUTION										
SMSA.....	[100.0]	100.0	96.0	44.7	32.2	12.5	51.3	4.0	[9.4]	[0.8]
entral cities.....	[100.0]	100.0	99.0	83.9	65.2	18.8	15.1	1.0	[8.2]	[1.0]
San Francisco city.....	[100.0]	100.0	99.0	90.1	88.5	1.6	9.0	1.0	[8.2]	[0.8]
Oakland city.....	[100.0]	100.0	99.1	69.8	11.5	58.3	29.3	0.9	[8.3]	[1.4]
utside central cities.....	[100.0]	100.0	94.6	27.2	17.4	9.7	67.5	5.4	[9.9]	[0.7]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the San Francisco-Oakland SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	1,278	392	887	100.0	100.0	100.0
Auto or truck.....	961	225	736	75.2	57.4	83.0
Drives alone.....	778	175	603	60.9	44.7	68.0
Carpool.....	183	49	133	14.3	12.6	15.0
Public transportation.....	201	119	82	15.7	30.4	9.2
Bus or streetcar.....	157	109	48	12.3	27.9	5.4
Subway or elevated.....	8	5	3	0.7	1.3	0.4
Railroad.....	34	4	30	2.6	1.0	3.3
Taxicab.....	1	1	-	0.1	0.2	-
Walks only.....	60	33	27	4.7	8.4	3.0
Other means.....	27	5	22	2.1	1.2	2.5
Bicycle.....	14	2	12	1.1	0.5	1.4
Motorcycle.....	8	2	6	0.6	0.5	0.7
All other means.....	5	1	4	0.4	0.3	0.5
Works at home.....	30	11	19	2.3	2.7	2.2

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the San Francisco-Oakland SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thousands)	Percent by means of transportation						
		Total	Auto or truck		Public transportation	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	1,278	100.0	60.9	14.3	15.7	4.7	2.1	2.3
SEX								
Male.....	761	100.0	64.6	13.9	12.4	4.2	2.9	1.9
Female.....	517	100.0	55.3	14.8	20.5	5.4	1.0	2.9
RACE								
White and other	1,168	100.0	61.0	14.3	15.2	4.9	2.3	2.4
Black.....	110	100.0	59.9	14.5	20.6	2.8	0.5	1.7
HOUSEHOLD RELATIONSHIP								
Head.....	801	100.0	64.6	12.8	14.7	4.1	1.9	1.9
Male.....	643	100.0	66.7	14.0	11.9	3.5	2.1	1.9
Female.....	158	100.0	56.2	8.1	26.1	6.5	1.1	2.1
Wife of head.....	262	100.0	57.7	18.5	15.6	4.4	0.5	3.4
Other member.....	215	100.0	50.9	14.7	19.6	7.3	5.0	2.6
EARNINGS								
Without earnings or not reported.....	169	100.0	56.2	12.0	13.9	6.3	2.4	9.0
With earnings.....	1,110	100.0	61.6	14.6	16.0	4.4	2.1	1.3
\$1 to 5,999.....	289	100.0	52.9	14.4	18.2	8.0	3.3	3.4
\$6,000 to 9,999.....	241	100.0	58.1	15.0	19.6	5.4	1.2	0.5
\$10,000 to 14,999.....	279	100.0	65.8	15.5	13.8	2.7	1.7	0.5
\$15,000 to 24,999.....	238	100.0	70.0	13.7	12.0	1.8	1.9	0.5
\$25,000 or more	62	100.0	64.9	13.8	16.2	1.9	1.8	1.6
Median earnings.....	\$10,416	...	\$11,324	\$10,378	\$9,024	\$6,374	\$8,238	\$3,126
Mean earnings.....	\$11,101	...	\$11,794	\$10,988	\$10,224	\$7,141	\$9,038	\$7,168

Table 4. Principal Means of Transportation, by Distance to Work, for the San Francisco-Oakland SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	1,128	100.0	7.7	13.3	15.5	24.1	13.0	16.8	9.1	0.5	7.3	9.8
Drives alone.....	688	100.0	4.3	13.4	16.1	26.0	13.7	17.0	8.9	0.6	7.6	10.1
Carpool.....	170	100.0	2.6	8.9	12.7	22.2	15.4	22.5	14.9	0.8	10.6	12.7
Public transportation ²	191	100.0	1.9	12.7	20.7	27.1	12.5	17.0	8.1	-	7.2	9.5
Bus or streetcar.....	149	100.0	2.2	15.7	25.1	28.9	10.8	13.3	3.8	-	5.7	7.6
Subway or elevated.....	8	100.0	3.6	2.4	15.7	33.7	22.9	18.1	4.8	-	8.7	9.8
Railroad.....	32	100.0	-	1.2	1.5	17.0	17.6	34.0	28.7	-	18.2	18.1
Walks only.....	56	100.0	80.6	18.8	0.7	-	-	-	-	-	0.1	0.2
Other means.....	23	100.0	15.0	34.3	12.9	16.7	9.9	9.0	2.1	-	2.6	5.6

¹Excludes workers with no fixed place of work and workers who worked at home.²Includes workers using taxicabs.**Table 5. Principal Means of Transportation, by Travel Time to Work, for the San Francisco-Oakland SMSA**

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	1,128	100.0	14.3	15.2	31.5	5.5	13.8	12.4	1.2	6.1	21.0	23.0
Drives alone.....	688	100.0	16.7	18.1	35.2	5.5	12.1	9.0	0.6	2.8	18.8	19.6
Carpool.....	170	100.0	8.7	13.5	31.3	6.6	16.7	16.2	2.0	5.1	23.4	24.9
Public transportation ²	191	100.0	1.0	3.2	20.7	5.6	21.1	25.4	2.9	20.1	34.1	37.2
Bus or streetcar.....	149	100.0	1.3	3.7	23.0	6.4	22.5	24.0	2.8	16.2	33.0	35.1
Subway or elevated.....	8	100.0	1.2	2.4	22.9	3.6	24.1	32.5	1.2	12.0	33.8	35.7
Railroad.....	32	100.0	-	0.3	9.0	2.2	14.2	30.6	3.4	40.4	46.5	48.1
Walks only.....	56	100.0	45.5	22.4	23.6	2.0	4.6	1.4	0.2	0.4	10.5	11.0
Other means.....	23	100.0	18.9	24.0	27.5	3.9	8.2	4.3	1.7	11.2	17.1	22.7

¹Excludes workers with no fixed place of work and workers who worked at home.²Includes workers using taxicabs.

Appendix A—Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 14,523 housing units were eligible for interview in AHS. Of these sample units, 861 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 934 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 26,135 persons 14 years and older. Of these, 359 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{Weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA a noninterview factor was computed separately for 5 noninterview cells.

A ratio estimation procedure was then employed for a sample housing units from the permit-issuing universe. The factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Travel-to-Work Supplement, using the existing weight after the DOT Travel-to-Work Supplement noninterview adjustment had been applied. For each SMSA, one person ratio estimate factor was calculated for the whole SMSA.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, initial difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

DOT Travel-to-Work Supplement. One possible source of error in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 7,200 conventional new construction units and 2,300 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and

nonsampling error, measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 through A-4 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These

estimates of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 517,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 6,560. Consequently, the 68-percent confidence interval, as shown by these data, is from 510,440 to 423,560. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 506,500 to 527,500 workers with 90-percent confidence and within the interval from 503,880 to 530,120 with 95-percent confidence.

Table 3 also shows that of the 517,000 female workers, 20.5 percent commuted by means of public transportation. Interpolation in table A-2 of the appendix shows that the standard error of the percent is approximately 0.5 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 20.0 to 21.0 percent; the 90-percent confidence interval is from 19.7 to 21.3 percent, and the 95-percent confidence interval is from 19.5 to 21.5 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 12.4 percent of the male workers in this SMSA commuted by means of public transportation. Thus, the apparent difference, as shown by these data, between the percentage of public transportation use by males and female is 8.1 percent. Table A-2 of the appendix shows the standard error of 12.4 percent on a base of 761,000 is approximately 0.3, while the standard error of 20.5 percent is approximately 0.5 percent. Therefore, the standard error of the estimated difference of 8.1 percent is about

$$0.6 = \sqrt{(0.3)^2 + (0.5)^2}$$

Consequently, the 68-percent confidence interval for the 8.1 percent difference is from 7.5 to 8.7 percent. Therefore, a conclusion that the average estimate of this difference, deduced from all possible samples, lies within a range computed this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 7.1 to 9.1 percent, and the 95-percent confidence interval is from 6.9 to 9.3 percent. Thus, we can conclude with 95-percent confidence that the percentage of female workers who used public transportation in 1975 is greater than the percentage of male workers, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.

Add to and subtract from 50 percent the standard error determined in step 1.

Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 18.8 minutes.

Using table A-2 of the appendix, the standard error of 50 percent on a base of 688,000 is found to be about 0.6 percent.

A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 48.8 and 51.2.

The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 34.8 percent of the persons fall in the intervals below the median interval, while 35.2 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{48.8 - 34.8}{35.2} \right) = 18.5$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{51.2 - 34.8}{35.2} \right) = 19.2$$

Thus, the 95-percent confidence interval on the estimated median is from 18.5 to 19.2 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} S^2}$$

where y is the size of the base, and b is a parameter which equals 106.2 for this SMSA, 84.0 for the central city, and 119.5 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for group i ; and $\bar{x}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{x}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 19.6 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min.	.167	4.5
10 to 14 min.	.181	12.0
15 to 24 min.	.352	19.5
25 to 29 min.	.055	27.0
30 to 34 min.	.121	32.0
35 to 49 min.	.090	42.0
50 to 59 min.	.006	54.5
60 min. or more	.028	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 256.7$$

The b parameter is equal to 106.2. Thus the standard error on 19.6 minutes, $\sigma_{\bar{x}}$ is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{106.2}{688,000} (256.7)} = 0.2 \text{ minutes.}$$

Consequently, the 68-percent confidence interval is estimated to be from 19.4 to 19.8 minutes, the 90-percent confidence interval is from 19.3 to 19.9 minutes, and the 95-percent confidence interval is from 19.2 to 20.0 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the San Francisco-Oakland, Calif. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

(68 chances out of 100)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	110	80	120	75,000.....	2,780	2,390	2,920
100.....	110	90	120	100,000.....	3,190	2,710	3,350
200.....	150	130	150	150,000.....	3,870	3,200	4,030
500.....	230	200	240	250,000.....	4,880	3,800	5,030
700.....	270	240	290	500,000.....	6,500	3,970	6,440
1,000.....	330	290	350	800,000.....	7,560	130	6,990
2,500.....	510	460	550	1,000,000.....	7,920	-	6,820
5,000.....	730	650	770	1,600,000.....	7,650	-	2,130
10,000.....	1,030	910	1,090	2,000,000.....	6,180	-	-
25,000.....	1,620	1,430	1,710	2,250,000.....	4,300	-	-
50,000.....	2,280	1,980	2,410				

Table A-2. Standard Errors for Estimated Percentage of Workers in the San Francisco-Oakland, Calif. SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	51.5	51.5	51.5	51.5	51.5	51.5
200.....	34.7	34.7	34.7	34.7	34.7	36.4
500.....	17.5	17.5	17.5	17.5	20.0	23.0
700.....	13.2	13.2	13.2	13.2	16.9	19.5
1,000.....	9.6	9.6	9.6	9.8	14.1	16.3
2,500.....	4.1	4.1	4.5	6.2	8.9	10.3
5,000.....	2.1	2.1	3.2	4.4	6.3	7.3
10,000.....	1.1	1.1	2.2	3.1	4.5	5.2
25,000.....	0.4	0.6	1.4	2.0	2.8	3.3
50,000.....	0.2	0.5	1.0	1.4	2.0	2.3
75,000.....	0.14	0.4	0.8	1.1	1.6	1.9
100,000.....	0.11	0.3	0.7	1.0	1.4	1.6
150,000.....	0.07	0.3	0.6	0.8	1.2	1.3
250,000.....	0.04	0.2	0.4	0.6	0.9	1.0
500,000.....	0.02	0.15	0.3	0.4	0.6	0.7
800,000.....	0.01	0.11	0.3	0.3	0.5	0.6
1,000,000.....	0.01	0.10	0.2	0.3	0.4	0.5
1,600,000.....	0.01	0.08	0.2	0.2	0.4	0.4
2,000,000.....	0.01	0.07	0.2	0.2	0.3	0.4
2,250,000.....	0.01	0.07	0.15	0.2	0.3	0.3

Table A-3. Standard Errors for Estimated Percentage of Workers in the Central Cities of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
00.....	45.6	45.6	45.6	45.6	45.6	45.8
00.....	29.6	29.6	29.6	29.6	29.6	32.4
00.....	14.4	14.4	14.4	14.4	17.7	20.5
00.....	10.7	10.7	10.7	10.7	15.0	17.3
,000.....	7.7	7.7	7.7	8.7	12.5	14.5
,500.....	3.2	3.2	4.0	5.5	7.9	9.2
,000.....	1.7	1.7	2.8	3.9	5.6	6.5
0,000.....	0.8	0.9	2.0	2.7	4.0	4.6
5,000.....	0.3	0.6	1.3	1.7	2.5	2.9
0,000.....	0.2	0.4	0.9	1.2	1.8	2.0
5,000.....	0.11	0.3	0.7	1.0	1.4	1.7
00,000.....	0.08	0.3	0.6	0.9	1.3	1.4
50,000.....	0.06	0.2	0.5	0.7	1.0	1.2
00,000.....	0.04	0.2	0.4	0.6	0.9	1.0
50,000.....	0.03	0.2	0.4	0.5	0.8	0.9
00,000.....	0.02	0.13	0.3	0.4	0.6	0.6
00,000.....	0.01	0.10	0.2	0.3	0.4	0.5

Table A-4. Standard Errors for Estimated Percentage of Workers in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	54.4	54.4	54.4	54.4	54.4	54.7
200.....	37.4	37.4	37.4	37.4	37.4	38.6
500.....	19.3	19.3	19.3	19.3	21.2	24.4
700.....	14.6	14.6	14.6	14.6	17.9	20.7
1,000.....	10.7	10.7	10.7	10.7	15.0	17.3
2,500.....	4.6	4.6	4.8	6.6	9.5	10.9
5,000.....	2.3	2.3	3.4	4.6	6.7	7.7
10,000.....	1.2	1.2	2.4	3.3	4.7	5.5
25,000.....	0.5	0.7	1.5	2.1	3.0	3.5
50,000.....	0.2	0.5	1.1	1.5	2.1	2.4
75,000.....	0.2	0.4	0.9	1.2	1.7	2.0
100,000.....	0.12	0.3	0.8	1.0	1.5	1.7
150,000.....	0.08	0.3	0.6	0.8	1.2	1.4
250,000.....	0.05	0.2	0.5	0.7	0.9	1.1
500,000.....	0.02	0.2	0.3	0.5	0.7	0.8
800,000.....	0.01	0.12	0.3	0.4	0.5	0.6
1,000,000.....	0.01	0.11	0.2	0.3	0.5	0.5
1,600,000.....	0.01	0.09	0.2	0.3	0.4	0.4

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person 240	Line number of respondent 241	If last worker in this household, mark this box
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7a. What is ...'s principal means of transportation to work?

242
1 ☐ Truck
2 ☐ Car or carpool } →

243
1 ☐ Drives alone – Skip to 8a
2 ☐ Shares driving
3 ☐ Drives others
4 ☐ Rides with someone else } Skip to 7c

5 ☐ Walks only – Skip to 8a
6 ☐ Works at home – Skip to 12a
7 ☐ Railroad
8 ☐ Subway or elevated
9 ☐ Bus or streetcar
10 ☐ Taxicab
11 ☐ Motorcycle
13 ☐ Bicycle
12 ☐ Other means – Specify _____

8d. Was ...'s place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c(4)?

248
1 ☐ Yes
2 ☐ No
3 ☐ Don't know

9. What time does ... usually leave for work?

249
_____ Time

250
1 ☐ a.m.
2 ☐ p.m.

10. How long does it usually take ... to get from home to work?

251
_____ Minutes

11. What is ...'s ONE-WAY distance from home to work?

252
_____ Miles
OR
0 ☐ Less than 1 mile

12a. In the last year, has ... changed his principal means of transportation to work?

253
1 ☐ Yes
2 ☐ No – Skip to 13

b. What was ...'s principal means of transportation to work (prior to the change)?

254
1 ☐ Truck
2 ☐ Car or carpool } →

255
1 ☐ Drove alone
2 ☐ Shared driving
3 ☐ Drove others
4 ☐ Rode with someone else

5 ☐ Walked only
6 ☐ Worked at home
7 ☐ Railroad
8 ☐ Subway or elevated
9 ☐ Bus or streetcar
10 ☐ Taxicab
11 ☐ Motorcycle
13 ☐ Bicycle
12 ☐ Other means – Specify _____

8a. Does ... usually WORK at the same location each day?

246
1 ☐ Yes – Skip to 8c
2 ☐ No

b. Does ... usually REPORT to the same location to begin work each day?

247
3 ☐ Yes
4 ☐ No – Skip to 12a

c. Where is ...'s usual place of work?

(1) Company or business establishment name

(2) Address (Number and street)
Note – If address (number and street name) are not known, enter building name, shopping center name, or other physical location description.

(3) Names of nearest intersecting streets

(4) Name of city, town, village, borough, etc.

(5) County

Place
type →

State

ZIP code

13. If "Yes" marked in 12a – ASK Compared to ...'s previous means of transportation to work (Given in 12b), how satisfied is ... with his present means of transportation to work – much more, more, about the same, less or much less satisfied?

256
1 ☐ Much more satisfied
2 ☐ More satisfied
3 ☐ About the same satisfaction
4 ☐ Less satisfied
5 ☐ Much less satisfied
6 ☐ Don't know
7 ☐ Did not work last year

13. If "No" marked in 12a – ASK Compared to a year ago, how satisfied is ... now with his principal means of transportation to work – much more, more, about the same, less or much less satisfied?

INTERVIEWER

Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a–e on page 19 of AHS-52 questionnaire.

Appendix C—Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or older who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, or off, etc.

Place of work. This is the actual geographic location at which the worker *usually* carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept of "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "-" means "rounds to zero." Three dots "..." means "not applicable."

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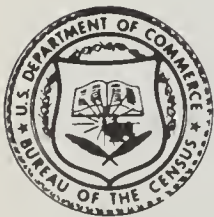
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Special Studies

Series P-23, No. 89
Issued August 1979

Selected Characteristics of Travel to Work in the Atlanta SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the Atlanta SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the SMSA in 1975, about 257,000 workers, was comprised of persons who both lived and worked in the suburbs (table 1). In comparison, about 153,000 workers who lived in the suburbs commuted into Atlanta to work. Approximately 108,000 of the workers who lived in Atlanta also worked there, while 36,000 workers made the reverse trip from the city to suburban employment.

MEANS OF TRANSPORTATION TO WORK

Of the more than 600,000 workers living in the Atlanta SMSA in 1975, the survey results show that a large majority (70 percent) usually drove to work alone (table 2). The proportion who carpooled (18 percent) was larger than the proportion who used public transportation (9 percent), while 2 percent walked, 1 percent worked at home, and 1 percent used other means. Workers who lived in the suburbs were more likely to drive alone to work (75 percent) than residents of the city (56 percent), while workers who lived in

Atlanta were more likely to use public transportation (22 percent) than suburban residents (4 percent).

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were more likely than men to carpool or use public transportation (table 3).

Race. Black workers showed a lower incidence of driving alone (51 percent) than White¹ workers (75 percent), and a correspondingly higher incidence of using public transportation (25 percent compared with 5 percent), and carpooling (21 percent and 17 percent, respectively).

Household relationship. Female household heads were less likely to drive alone to work and more likely to use public transportation than male household heads in 1975 (table 3). Comparing working wives with female household heads, the data indicate that the wives were more likely to drive alone or to carpool, and less likely to use public transit than female heads of households. Twenty-two percent of the female heads used public transportation compared with 8 percent of the working wives.

Earnings. Comparing the three most widely used means of transportation, workers who drove alone to work had the highest median earnings (\$10,347), followed by those in carpools (\$7,937), and users of public transit (\$6,060). For the relatively small number of persons who walked to work (about 2 percent of all workers), the median earnings in 1975 were only \$4,301, while the figure for workers who used other means (about 1 percent of the total) was \$11,022 (not significantly greater than the median for workers who drove alone).

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was about 11 miles in 1975 (table 4). Workers who carpooled reported traveling slightly farther (12 miles), on the average, than workers who either drove alone (11 miles) or used public transportation (10 miles).

Travel time by means of transportation. The average commuting trip in the SMSA took about 24 minutes in 1975 (table 5). Workers who drove alone reported an average of about 22 minutes to get to work, compared with 25 minutes for those who carpooled. Public transportation users spent an average of about 42 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 13,518 sample households in the Atlanta SMSA were eligible to answer the inquiries contained in the Travel-to-Work Supplement. The interviews resulted in responses from 24,461 workers 14

years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)

Albany-Schenectady-Troy, N.Y.
Anaheim-Santa Ana-Garden Grove,
Calif.
Boston, Mass.*
Dallas, Tex.
Detroit, Mich.*
Fort Worth, Tex.
Los Angeles-Long Beach, Calif.*
Madison, Wis.†
Memphis, Tenn.-Ark.
Minneapolis-St. Paul, Minn.
Newark, N.J.
Orlando, Fla.
Phoenix, Ariz.
Pittsburgh, Pa.
Saginaw, Mich.
Salt Lake City, Utah
Spokane, Wash.
Tacoma, Wash.
Washington, D.C.-Md.-Va.*
Wichita, Kans.

SURVEY GROUP II (1975 to 1976)

Atlanta, Ga.*
Chicago, Ill.*
Cincinnati, Ohio-Ky.-Ind.
Colorado Springs, Colo.
Columbus, Ohio
Hartford, Conn.
Kansas City, Mo.-Kans.
Miami, Fla.
Milwaukee, Wis.
New Orleans, La.
Newport News-Hampton, Va.
Paterson-Clifton-Passaic, N.J.
Philadelphia, Pa.-N.J.*
Portland, Oreg.-Wash.
Rochester, N.Y.
San Antonio, Tex.
San Bernardino-Riverside-Ontario,
Calif.
San Diego, Calif.
San Francisco-Oakland, Calif.*
Springfield-Chicopee-Holyoke,
Mass.-Conn.

SURVEY GROUP III (1976 to 1977)

Allentown-Bethlehem-Easton, Pa.-N.J.
Baltimore, Md.
Birmingham, Ala.
Buffalo, N.Y.
Cleveland, Ohio
Denver, Colo.
Grand Rapids, Mich.
Honolulu, Hawaii
Houston, Tex.*
Indianapolis, Ind.
Las Vegas, Nev.
Louisville, Ky.-Ind.
New York, N.Y.*
Oklahoma City, Okla.
Omaha, Nebr.-Iowa
Providence-Pawtucket-Warwick, R.I.-
Mass.
Raleigh, N.C.
Sacramento, Calif.
St. Louis, Mo.-Ill.*
Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group III are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the Atlanta SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

... included: SMSA as of the 1970 census. For explanation of symbols, see text)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside the SMSA			Outside the SMSA		
			Total	Atlanta city	Outside central city			
SMSA.....	634	562	553	261	293	8	65	7
Atlanta city.....	159	144	143	108	36	1	14	1
Outside central city.....	474	418	410	153	257	8	51	6
PERCENT DISTRIBUTION								
SMSA.....	[100.0]	100.0	98.5	46.4	52.1	1.5	[10.3]	[1.1]
Atlanta city.....	[100.0]	100.0	99.4	74.8	24.7	0.6	[8.7]	[0.8]
Outside central city.....	[100.0]	100.0	98.2	36.6	61.6	1.8	[10.8]	[1.2]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the Atlanta SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	634	159	474	100.0	100.0	100.0
Auto or truck.....	557	117	439	87.8	73.7	92.6
Drives alone.....	444	90	354	70.0	56.1	74.7
Carpool.....	113	28	85	17.8	17.5	17.9
Public transportation.....	55	35	20	8.7	22.2	4.2
Walks only.....	11	4	7	1.8	2.8	1.4
Other means.....	4	1	4	0.7	0.4	0.8
Bicycle.....	1	-	1	0.1	-	0.1
Motorcycle.....	2	-	2	0.3	-	0.3
All other means.....	2	-	2	0.3	-	0.4
Works at home.....	7	2	5	1.0	1.0	1.0

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the Atlanta SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thou- sands)	Percent by means of transportation						
		Total	Auto or truck		Public trans- porta- tion	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	634	100.0	70.0	17.8	8.7	1.8	0.7	1.0
SEX								
Male.....	375	100.0	75.1	15.8	5.7	1.7	1.0	0.7
Female.....	259	100.0	62.8	20.6	13.1	1.8	0.2	1.4
RACE								
White and other	504	100.0	74.9	16.9	4.5	1.7	0.8	1.2
Black.....	130	100.0	51.0	21.2	25.1	2.1	0.3	0.3
HOUSEHOLD RELATIONSHIP								
Head.....	396	100.0	73.9	14.9	8.2	1.4	0.8	0.8
Male.....	323	100.0	76.9	14.9	5.1	1.3	1.0	0.8
Female.....	73	100.0	60.6	15.1	21.7	1.9	0.1	0.5
Wife of head.....	143	100.0	66.0	22.5	7.6	1.5	0.3	2.1
Other member.....	94	100.0	59.9	22.4	12.9	3.5	1.0	0.3
EARNINGS								
Without earnings or not reported.....	62	100.0	68.2	16.6	8.7	2.3	0.6	3.6
With earnings.....	572	100.0	70.2	17.9	8.7	1.7	0.7	0.8
\$1 to 5,999.....	165	100.0	56.6	22.6	14.9	3.8	0.7	1.4
\$6,000 to 9,999.....	145	100.0	68.8	19.5	9.9	1.0	0.4	0.3
\$10,000 to 14,999.....	135	100.0	77.2	16.4	4.5	0.7	0.6	0.7
\$15,000 to 24,999.....	91	100.0	82.0	12.0	4.3	0.5	0.9	0.3
\$25,000 or more	36	100.0	83.0	10.6	2.8	1.1	1.7	0.8
Median earnings.....	\$9,334	...	\$10,347	\$7,937	\$6,060	\$4,301	\$11,022	\$5,520
Mean earnings.....	\$10,644	...	\$11,640	\$8,807	\$6,979	\$6,445	\$16,523	\$7,863

Table 4. Principal Means of Transportation, by Distance to Work, for the Atlanta SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	562	100.0	4.8	9.3	11.7	26.1	19.6	21.3	6.9	0.3	9.1	10.5
Drives alone.....	392	100.0	3.3	9.7	12.4	26.9	19.8	20.9	6.8	0.3	9.1	10.5
Carpool.....	105	100.0	2.9	8.3	9.2	24.2	20.1	25.1	9.8	0.4	10.9	12.0
Public transportation.....	52	100.0	2.3	8.3	13.5	29.4	22.1	21.2	3.1	-	8.9	9.6
Walks only.....	11	100.0	90.7	8.4	-	-	-	-	-	-	0.1	0.1
Other means.....	3	100.0	10.7	21.4	10.7	28.6	10.7	7.1	10.7	-	5.3	7.6

¹Excludes workers with no fixed place of work and workers who worked at home.**Table 5. Principal Means of Transportation, by Travel Time to Work, for the Atlanta SMSA**

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	562	100.0	12.5	12.5	32.0	6.7	16.5	13.9	0.8	5.1	22.3	23.8
Drives alone.....	392	100.0	13.4	14.0	34.6	7.1	16.1	11.9	0.6	2.3	21.0	21.5
Carpool.....	105	100.0	9.6	10.3	31.7	7.2	18.5	17.9	0.6	4.3	24.0	25.0
Public transportation.....	52	100.0	1.5	4.0	15.6	4.6	18.5	23.8	3.3	28.7	38.1	42.3
Walks only.....	11	100.0	62.6	16.8	15.9	-	1.9	2.8	-	-	7.7	8.3
Other means.....	3	100.0	14.3	25.0	32.1	-	10.7	14.3	-	7.1	18.4	22.8

¹Excludes workers with no fixed place of work and workers who worked at home.

Appendix A—Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 13,518 housing units were eligible for interview in AHS. Of these sample units, 570 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 1,484 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 24,612 persons 14 years and older. Of these, 151 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is not 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA, a noninterview factor was computed separately for 56 noninterview cells.

A ratio estimation procedure was then employed for all sample housing units from the permit-issuing universe. This factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement, the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, a person ratio estimate factor was calculated for each sector.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 10,100 conventional new construction units and 5,200 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and

nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 through A-4 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These

estimates of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 259,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 3,240. Consequently, the 68-percent confidence interval, as shown by these data, is from 255,760 to 262,240. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 253,820 to 264,180 workers with 90-percent confidence and within the interval from 252,520 to 265,480 with 95-percent confidence.

Table 3 also shows that of the 259,000 female workers, 13.1 percent commuted by means of public transportation. Interpolation in table A-2 of the appendix shows that the standard error of the percent is approximately 0.4 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 12.7 to 13.5 percent; the 90-percent confidence interval is from 12.5 to 13.7 percent; and the 95-percent confidence interval is from 12.3 to 13.9 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 5.7 percent of the male workers in this SMSA commuted by means of public transportation. Thus, the apparent difference, as shown by these data, between the percentage of public transportation use by males and females is 7.4 percent. Table A-2 of the appendix shows the standard error of 5.7 percent on a base of 375,000 is approximately 0.3, while the standard error of 13.1 percent is approximately 0.4 percent. Therefore, the standard error of the estimated difference of 7.4 percent is about

$$0.5 = \sqrt{(0.3)^2 + (0.4)^2}$$

Consequently, the 68-percent confidence interval for the 7.4 percent difference is from 6.9 to 7.9 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 6.6 to 8.2 percent, and the 95-percent confidence interval is from 6.4 to 8.4 percent. Thus, we can conclude with 95-percent confidence that the percentage of female workers who used public transportation in 1975 is greater than the percentage of male workers who used transit, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

1. Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.
2. Add to and subtract from 50 percent the standard error determined in step 1.
3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 21.0 minutes.

1. Using table A-2 of the appendix, the standard error of 50 percent on a base of 392,000 is found to be about 0.6 percent.
2. A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 48.8 and 51.2.
3. The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 27.4 percent of the persons fall in the intervals below the median interval, while 34.6 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{48.8 - 27.4}{34.6} \right) = 20.7$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{51.2 - 27.4}{34.6} \right) = 21.4$$

Thus, the 95-percent confidence interval on the estimated median is from 20.7 to 21.4 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b S^2}{y}}$$

where y is the size of the base, and b is a parameter which equals 52.3 for this SMSA, 30.7 for the central city, and 68.9 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for

group i ; and $\bar{X}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{X}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 21.5 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min.	.134	4.5
10 to 14 min.	.140	12.0
15 to 24 min.	.346	19.5
25 to 29 min.	.071	27.0
30 to 34 min.	.161	32.0
35 to 49 min.	.119	42.0
50 to 59 min.	.006	54.5
60 min. or more	.023	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 233.1$$

The b parameter is equal to 52.3. Thus the standard error on 21.5 minutes, $\sigma_{\bar{x}}$, is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{52.3}{392,000} (233.1)} = 0.2 \text{ minutes}$$

Consequently, the 68-percent confidence interval is estimated to be from 21.3 to 21.7 minutes, the 90-percent confidence interval is from 21.2 to 21.8 minutes, and the 95-percent confidence interval is from 21.1 to 21.9 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the Atlanta, Ga. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

(68 chances out of 100)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	50	30	70	25,000.....	1,130	840	1,290
50.....	50	40	70	50,000.....	1,580	1,140	1,800
100.....	70	60	80	75,000.....	1,910	1,330	2,170
200.....	100	80	120	100,000.....	2,180	1,460	2,460
500.....	160	120	190	150,000.....	2,610	1,570	2,910
700.....	190	150	220	250,000.....	3,200	1,310	3,460
1,000.....	230	170	260	300,000.....	3,400	800	3,620
2,500.....	360	280	410	500,000.....	3,830	-	3,660
5,000.....	510	390	590	800,000.....	3,540	-	1,140
10,000.....	720	550	820	1,000,000.....	2,550	-	-

Table A-2. Standard Errors for Estimated Percentage of Workers in the Atlanta, Ga. SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
50.....	51.1	51.1	51.1	51.1	51.1	51.1
100.....	34.3	34.3	34.3	34.3	34.3	36.2
200.....	20.7	20.7	20.7	20.7	22.1	25.6
500.....	9.5	9.5	9.5	9.7	14.0	16.2
700.....	7.0	7.0	7.0	8.2	11.8	13.7
1,000.....	5.0	5.0	5.0	6.9	9.9	11.4
2,500.....	2.0	2.0	3.2	4.3	6.3	7.2
5,000.....	1.0	1.0	2.2	3.1	4.4	5.1
10,000.....	0.5	0.7	1.6	2.2	3.1	3.6
25,000.....	0.2	0.5	1.0	1.4	2.0	2.3
50,000.....	0.10	0.3	0.7	1.0	1.4	1.6
75,000.....	0.07	0.3	0.6	0.8	1.1	1.3
100,000.....	0.05	0.2	0.5	0.7	1.0	1.1
150,000.....	0.03	0.2	0.4	0.6	0.8	0.9
250,000.....	0.02	0.14	0.3	0.4	0.6	0.7
300,000.....	0.02	0.13	0.3	0.4	0.6	0.7
500,000.....	0.01	0.10	0.2	0.3	0.4	0.5
800,000.....	0.01	0.08	0.2	0.2	0.4	0.4
1,000,000.....	0.01	0.07	0.2	0.2	0.3	0.4

Table A-3. Standard Errors for Estimated Percentage of Workers in the Central City of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
50.....	38.0	38.0	38.0	38.0	38.0	39.2
100.....	23.5	23.5	23.5	23.5	24.0	27.7
200.....	13.3	13.3	13.3	13.3	17.0	19.6
500.....	5.8	5.8	5.8	7.4	10.7	12.4
700.....	4.2	4.2	4.6	6.3	9.1	10.5
1,000.....	3.0	3.0	3.8	5.3	7.6	8.8
2,500.....	1.2	1.2	2.4	3.3	4.8	5.5
5,000.....	0.6	0.8	1.7	2.4	3.4	3.9
10,000.....	0.3	0.6	1.2	1.7	2.4	2.8
25,000.....	0.12	0.3	0.8	1.1	1.5	1.8
50,000.....	0.06	0.2	0.5	0.7	1.1	1.2
75,000.....	0.04	0.2	0.4	0.6	0.9	1.0
100,000.....	0.03	0.2	0.4	0.5	0.8	0.9
150,000.....	0.02	0.14	0.3	0.4	0.6	0.7
250,000.....	0.01	0.11	0.2	0.3	0.5	0.6
300,000.....	0.01	0.10	0.2	0.3	0.4	0.5

Table A-4. Standard Errors for Estimated Percentage of Workers in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	40.8	40.8	40.8	40.8	40.8	41.5
200.....	25.6	25.6	25.6	25.6	25.6	29.3
500.....	12.1	12.1	12.1	12.1	16.1	18.6
700.....	9.0	9.0	9.0	9.4	13.6	15.7
1,000.....	6.4	6.4	6.4	7.9	11.4	13.1
2,500.....	2.7	2.7	3.6	5.0	7.2	8.3
5,000.....	1.4	1.4	2.6	3.5	5.1	5.9
10,000.....	0.7	0.8	1.8	2.5	3.6	4.1
25,000.....	0.3	0.5	1.1	1.6	2.3	2.6
50,000.....	0.14	0.4	0.8	1.1	1.6	1.9
75,000.....	0.09	0.3	0.7	0.9	1.3	1.5
100,000.....	0.07	0.3	0.6	0.8	1.1	1.3
150,000.....	0.05	0.2	0.5	0.6	0.9	1.1
250,000.....	0.03	0.2	0.4	0.5	0.7	0.8
300,000.....	0.02	0.15	0.3	0.5	0.7	0.8
500,000.....	0.01	0.12	0.3	0.4	0.5	0.6
800,000.....	0.01	0.09	0.2	0.3	0.4	0.5

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person	Line number of respondent	If last worker in this household, mark this box <input type="checkbox"/>
<p>Line number of person: (240)</p> <p>7a. What is . . . 's principal means of transportation to work?</p> <p>(242) 1 <input type="checkbox"/> Truck } → 2 <input type="checkbox"/> Car or carpool }</p> <p>(243) 1 <input type="checkbox"/> Drives alone — Skip to 8a 2 <input type="checkbox"/> Shares driving } 3 <input type="checkbox"/> Drives others } Skip to 7c 4 <input type="checkbox"/> Rides with someone else }</p> <p>5 <input type="checkbox"/> Walks only — Skip to 8a 6 <input type="checkbox"/> Works at home — Skip to 12a 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means — Specify _____</p> <p>b. Does . . . usually ALSO use a car for part of the trip to work? (244) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No — Skip to 8a</p> <p>c. How many people, including . . . , usually ride in the car to work? (245) _____ Number</p> <p>8a. Does . . . usually WORK at the same location each day? (246) 1 <input type="checkbox"/> Yes — Skip to 8c 2 <input type="checkbox"/> No</p> <p>b. Does . . . usually REPORT to the same location to begin work each day? (247) 3 <input type="checkbox"/> Yes 4 <input type="checkbox"/> No — Skip to 12a</p> <p>c. Where is . . . 's usual place of work? (1) Company or business establishment name _____ _____ _____ (2) Address (Number and street) Note — If address (number and street name) are not known, enter building name, shopping center name, or other physical location description. _____ _____ _____ (3) Names of nearest intersecting streets _____ _____ _____ (4) Name of city, town, village, borough, etc. _____ _____ _____ (5) County _____ _____ _____ State ZIP code _____</p>	<p>Line number of respondent: (241)</p> <p>8d. Was . . . 's place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c(4))? (248) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Don't know</p> <p>9. What time does . . . usually leave for work? (249) _____ Time (250) 1 <input type="checkbox"/> a.m. 2 <input type="checkbox"/> p.m.</p> <p>10. How long does it usually take . . . to get from home to work? (251) _____ Minutes</p> <p>11. What is . . . 's ONE-WAY distance from home to work? (252) _____ Miles OR 0 <input type="checkbox"/> Less than 1 mile</p> <p>12a. In the last year, has . . . changed his principal means of transportation to work? (253) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No — Skip to 13</p> <p>b. What was . . . 's principal means of transportation to work (prior to the change)? (254) 1 <input type="checkbox"/> Truck } → 2 <input type="checkbox"/> Car or carpool }</p> <p>(255) 1 <input type="checkbox"/> Drove alone 2 <input type="checkbox"/> Shared driving 3 <input type="checkbox"/> Drove others 4 <input type="checkbox"/> Rode with someone else 5 <input type="checkbox"/> Walked only 6 <input type="checkbox"/> Worked at home 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means — Specify _____</p>	<p>13. If "Yes" marked in 12a — ASK Compared to . . . 's previous means of transportation to work (Given in 12b), how satisfied is . . . with his present means of transportation to work — much more, more, about the same, less or much less satisfied? (256) 1 <input type="checkbox"/> Much more satisfied 2 <input type="checkbox"/> More satisfied 3 <input type="checkbox"/> About the same satisfaction 4 <input type="checkbox"/> Less satisfied 5 <input type="checkbox"/> Much less satisfied 6 <input type="checkbox"/> Don't know 7 <input type="checkbox"/> Did not work last year</p> <p>If "No" marked in 12a — ASK Compared to a year ago, how satisfied is . . . now with his principal means of transportation to work — much more, more, about the same, less or much less satisfied? _____</p>
		<p>Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a–e on page 19 of AHS-52 questionnaire.</p>

Appendix C—Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker *usually* carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "-" means "rounds to or represents zero." Three dots "..." means "not applicable."

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Population estimates for counties for

selected States in which the figures are prepared by a State agency as part of the Federal-State Cooperative Program for Local Population Estimates.

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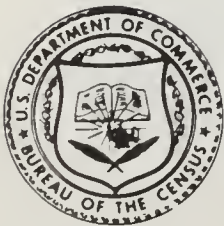
In addition to the findings of the Census of Population, conducted every 10 years, the Bureau of the Census publishes continuing and up-to-date statistics on population counts, characteristics, and other special studies on the American people. Data are issued in the seven separate series of reports described here and are released under the general title, Current Population Reports.

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Series P-23, No. 90
Issued August 1979

Selected Characteristics of Travel to Work in the Paterson-Clifton-Passaic SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the Paterson-Clifton-Passaic SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the SMSA in 1975, about 242,000 workers, was that of persons who both lived and worked in the suburbs (table 1). In comparison, about 127,000 workers who lived in the suburbs worked outside the SMSA, and only 28,000 worked in the central cities. Approximately 46,000 of the workers who lived in the central cities also worked there, while 28,000 worked in the suburbs, and 18,000 were employed outside the SMSA. Among all workers in the SMSA in 1975, 30 percent worked outside the two-county area.

MEANS OF TRANSPORTATION TO WORK

Of the more than 500,000 workers living in the Paterson-Clifton-Passaic SMSA in 1975, the survey results show that the majority, 66 percent, usually drove to work alone (table 2). The proportion who traveled in carpools to get to work (16 percent) was greater than the proportion who used public transportation (11 percent), while 5 percent walked, 1 percent worked at home, and 1 percent used other means. Workers who lived in the suburbs were somewhat more likely

to drive alone to work (67 percent) than residents of the central cities (62 percent), but the apparent difference between city and suburban residents in the rate of public transportation use was not statistically significant.

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were more likely than men to carpool (table 3). The difference between males and females in the rate of use of public transportation, however, was not significant.

Race. Black workers showed a higher incidence of using public transportation (19 percent) than White¹ workers (11 percent), and there is some evidence that Black workers also had a higher rate of carpooling (table 3). The rate at which Black workers drove alone to work (51 percent), however, was lower than the corresponding figure for White workers (67 percent).

Household relationship. Female household heads were less likely to drive alone to work, and more likely to use public transportation than male household heads in 1975 (table 3). Comparing working wives with female household heads, the data indicate that the wives were more likely to carpool and less likely to use public transit than female heads of households. Fifteen percent of the female heads used public transportation, compared with 11 percent of the working wives.

Earnings. Comparing the three most widely used means of transportation, workers who used public transportation to get to work had the highest median earnings (\$12,045), followed by those who drove alone (\$10,819), and workers in carpools (\$8,762).

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was 9 miles in 1975 (table 4). Workers who used public transportation to get to work reported traveling farther (15 miles), on the average, than workers who drove alone or carpooled (9 miles each).

Travel time by means of transportation. The average commuting trip in the SMSA took 24 minutes in 1975 (table 5). Workers who drove alone reported an average of 20 minutes to get to work, compared with 23 minutes for those who carpooled. Public transportation users, on the other hand, spent an average of 54 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 4,981 sample households in the Paterson-Clifton-Passaic SMSA were eligible to answer the inquiries contained in the Travel-to-Work Supplement. The interviews resulted in responses from

10,937 workers 14 years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)

Albany-Schenectady-Troy, N.Y.
Anaheim-Santa Ana-Garden Grove,
Calif.
Boston, Mass.*
Dallas, Tex.
Detroit, Mich.*
Fort Worth, Tex.
Los Angeles-Long Beach, Calif.*
Madison, Wis.†
Memphis, Tenn.-Ark.
Minneapolis-St. Paul, Minn.
Newark, N.J.
Orlando, Fla.
Phoenix, Ariz.
Pittsburgh, Pa.
Saginaw, Mich.
Salt Lake City, Utah
Spokane, Wash.
Tacoma, Wash.
Washington, D.C.-Md.-Va.*
Wichita, Kans.

SURVEY GROUP II (1975 to 1976)

Atlanta, Ga.*
Chicago, Ill.*
Cincinnati, Ohio-Ky.-Ind.
Colorado Springs, Colo.
Columbus, Ohio
Hartford, Conn.
Kansas City, Mo.-Kans.
Miami, Fla.
Milwaukee, Wis.
New Orleans, La.
Newport News-Hampton, Va.
Paterson-Clifton-Passaic, N.J.
Philadelphia, Pa.-N.J.*
Portland, Oreg.-Wash.
Rochester, N.Y.
San Antonio, Tex.
San Bernardino-Riverside-Ontario,
Calif.
San Diego, Calif.
San Francisco-Oakland, Calif.*
Springfield-Chicopee-Holyoke,
Mass.-Conn.

SURVEY GROUP III (1976 to 1977)

Allentown-Bethlehem-Easton, Pa.-N.J.
Baltimore, Md.
Birmingham, Ala.
Buffalo, N.Y.
Cleveland, Ohio
Denver, Colo.
Grand Rapids, Mich.
Honolulu, Hawaii
Houston, Tex.*
Indianapolis, Ind.
Las Vegas, Nev.
Louisville, Ky.-Ind.
New York, N.Y.*
Oklahoma City, Okla.
Omaha, Nebr.-Iowa
Providence-Pawtucket-Warwick, R.I.-
Mass.
Raleigh, N.C.
Sacramento, Calif.
St. Louis, Mo.-Ill.*
Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group III are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the Paterson-Clifton-Passaic SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside the SMSA			Outside the SMSA		
			Total	Inside central cities	Outside central cities			
SMSA.....	539	487	343	74	270	144	46	6
Inside central cities.....	98	91	73	46	28	18	5	2
Outside central cities.....	441	396	270	28	242	127	41	4
PERCENT DISTRIBUTION								
SMSA.....	[100.0]	100.0	70.4	15.1	55.3	29.6	[8.5]	[1.0]
Inside central cities.....	[100.0]	100.0	80.5	50.2	30.2	19.5	[5.3]	[1.9]
Outside central cities.....	[100.0]	100.0	68.1	7.0	61.1	31.9	[9.2]	[0.8]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the Paterson-Clifton-Passaic SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	539	98	441	100.0	100.0	100.0
Auto or truck.....	445	80	364	82.5	82.0	82.7
Drives alone.....	357	61	297	66.3	61.7	67.3
Carpool.....	88	20	68	16.3	20.2	15.4
Public transportation.....	59	10	49	10.9	10.2	11.1
Bus or streetcar.....	45	9	36	8.4	9.5	8.1
Subway or elevated.....	4	-	4	0.6	-	0.8
Railroad.....	10	1	9	1.8	0.7	2.1
Taxicab.....	-	-	-	-	-	-
Walks only.....	25	7	18	4.7	7.4	4.0
Other means.....	4	-	4	0.7	-	0.9
Bicycle.....	3	-	3	0.5	-	0.6
Motorcycle.....	1	-	1	0.1	-	0.2
All other means.....	1	-	1	0.1	-	0.1
Works at home.....	6	-	6	1.1	-	1.3

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the Paterson-Clifton-Passaic SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thousands)	Percent by means of transportation						
		Total	Auto or truck		Public transportation	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	539	100.0	66.3	16.3	10.9	4.7	0.7	1.1
SEX								
Male.....	337	100.0	70.3	13.9	10.4	3.4	1.1	1.0
Female.....	202	100.0	59.5	20.3	11.8	6.8	0.1	1.3
RACE								
White and other	508	100.0	67.2	16.0	10.5	4.4	0.7	1.2
Black.....	31	100.0	50.8	21.0	18.8	8.4	0.6	0.3
HOUSEHOLD RELATIONSHIP								
Head.....	323	100.0	70.5	13.5	11.6	3.1	0.3	1.0
Male.....	281	100.0	71.8	13.2	11.1	2.6	0.3	1.1
Female.....	42	100.0	61.9	15.9	15.2	6.7	-	0.5
Wife of head.....	116	100.0	58.8	21.9	10.6	6.7	0.1	1.9
Other member.....	100	100.0	61.4	18.5	9.3	7.3	2.9	0.7
EARNINGS								
Without earnings or not reported.....	47	100.0	67.0	15.6	5.3	6.6	-	5.5
With earnings.....	491	100.0	66.2	16.3	11.5	4.5	0.8	0.7
\$1 to 5,999.....	133	100.0	59.3	19.2	9.4	9.1	1.8	1.1
\$6,000 to 9,999.....	107	100.0	64.7	18.2	9.6	6.1	0.7	0.7
\$10,000 to 14,999.....	116	100.0	70.6	15.4	10.5	2.5	0.5	0.5
\$15,000 to 24,999.....	99	100.0	71.7	13.0	14.4	0.2	0.4	0.4
\$25,000 or more	37	100.0	67.2	12.3	19.1	0.5	-	1.1
Median earnings.....	\$10,245	...	\$10,819	\$8,762	\$12,045	\$5,383	\$3,471	\$8,177
Mean earnings.....	\$11,385	...	\$11,790	\$10,170	\$13,559	\$5,596	\$5,249	\$9,884

Table 4. Principal Means of Transportation, by Distance to Work, for the Paterson-Clifton-Passaic SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	487	100.0	10.7	15.2	14.0	22.7	14.4	15.2	7.1	0.7	6.7	9.0
Drives alone.....	322	100.0	7.0	16.1	15.5	26.5	15.2	13.2	5.7	0.8	6.6	8.7
Carpool.....	82	100.0	7.2	16.3	15.9	23.9	14.6	12.7	8.4	1.1	6.7	9.4
Public transportation ²	56	100.0	1.3	8.9	8.9	9.7	16.5	37.4	17.4	-	15.8	14.7
Bus or streetcar.....	43	100.0	1.6	11.0	11.7	10.3	18.2	33.9	13.1	-	13.7	12.9
Subway or elevated.....	3	100.0	-	-	-	15.2	18.2	51.5	18.2	-	18.1	17.3
Railroad.....	10	100.0	-	-	-	5.3	8.4	48.4	37.9	-	22.0	21.9
Walks only.....	24	100.0	91.3	8.3	0.4	-	-	-	-	-	-	0.1
Other means.....	3	100.0	24.1	58.6	6.9	6.9	-	3.4	-	-	1.3	2.1

¹Excludes workers with no fixed place of work and workers who worked at home.²Includes workers using taxicabs.**Table 5. Principal Means of Transportation, by Travel Time to Work, for the Paterson-Clifton-Passaic SMSA**

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	487	100.0	18.6	15.8	28.6	4.9	11.2	9.5	1.2	10.2	20.0	23.9
Drives alone.....	322	100.0	19.5	17.2	32.3	6.0	11.8	8.2	0.8	4.1	18.6	19.9
Carpool.....	82	100.0	17.5	16.2	29.3	3.7	12.7	11.4	2.2	7.2	20.1	23.2
Public transportation ²	56	100.0	0.2	4.1	9.7	2.0	8.9	18.1	2.5	54.6	61.2	54.0
Bus or streetcar.....	43	100.0	0.2	5.1	10.7	2.6	10.7	20.1	2.3	48.4	52.4	50.9
Subway or elevated.....	3	100.0	-	-	-	-	6.1	18.2	3.0	75.8	65.9	63.9
Railroad.....	10	100.0	-	-	6.3	-	2.1	10.5	4.2	77.9	67.9	65.6
Walks only.....	24	100.0	50.0	21.5	21.9	1.7	3.7	0.8	-	0.4	9.5	9.6
Other means.....	3	100.0	34.5	17.2	31.0	-	6.9	10.3	-	-	13.9	15.0

¹Excludes workers with no fixed place of work and workers who worked at home.²Includes workers using taxicabs.

Appendix A—Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 4,981 housing units were eligible for interview in AHS. Of these sample units, 253 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 193 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 10,976 persons 14 years and older. Of these, 39 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{Weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA, a noninterview factor was computed separately for 56 noninterview cells.

A ratio estimation procedure was then employed for all sample housing units from the permit-issuing universe. This factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement, the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, a person ratio estimate factor was calculated for each sector.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 2,100 conventional new construction units and no new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and

nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 and A-2 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These

estimates of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 202,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 4,370. Consequently, the 68-percent confidence interval, as shown by these data, is from 197,630 to 206,370. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 195,010 to 208,990 workers with 90-percent confidence and within the interval from 193,260 to 210,740 with 95-percent confidence.

Table 3 also shows that of the 202,000 female workers, 59.5 percent drove alone to work in an auto or truck. Interpolation in table A-2 of the appendix shows that the standard error of the percent is approximately 1.1 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 58.4 to 60.6 percent; the 90-percent confidence interval is from 57.7 to 61.3 percent; and the 95-percent confidence interval is from 57.3 to 61.7 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 70.3 percent of the male workers in this SMSA drove to work alone. Thus, the apparent difference, as shown by these data, between the percentage of males and females who drove to work alone is 10.8 percent. Table A-2 of the appendix shows the standard error of 70.3 percent on a base of 337,000 is approximately 0.8, while the standard error of 59.5 percent is approximately 1.1 percent. Therefore, the standard error of the estimated difference of 10.8 percent is about

$$1.4 = \sqrt{(0.8)^2 + (1.1)^2}$$

Consequently, the 68-percent confidence interval for the 10.8-percent difference is from 9.4 to 12.2 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 8.6 to 13.0 percent, and the 95-percent confidence interval is from 8.0 to 13.6 percent. Thus, we can conclude with 95-percent confidence that the percentage of male workers who drove to work alone in 1975 is greater than the percentage of female workers who drove alone, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

1. Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.
2. Add to and subtract from 50 percent the standard error determined in step 1.
3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 18.6 minutes.

1. Using table A-2 of the appendix, the standard error of 50 percent on a base of 322,000 is found to be about 1.0 percent.
2. A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 48.0 and 52.0.
3. The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 36.7 percent of the persons fall in the intervals below the median interval, while 32.3 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{48.0 - 36.7}{32.3} \right) = 18.0$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{52.0 - 36.7}{32.3} \right) = 19.2$$

Thus, the 95-percent confidence interval on the estimated median is from 18.0 to 19.2 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} S^2}$$

where y is the size of the base, and b is a parameter which equals 117.9 for this SMSA, 103.9 for the central city, and 118.2 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for group i ; and $\bar{X}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{X}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 19.9 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min.	.195	4.5
10 to 14 min.	.172	12.0
15 to 24 min.	.323	19.5
25 to 29 min.	.060	27.0
30 to 34 min.	.118	32.0
35 to 49 min.	.082	42.0
50 to 59 min.	.008	54.5
60 min. or more	.041	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 816.6 - 493.1 = 323.5$$

The b parameter is equal to 117.9. Thus the standard error on 19.9 minutes, $\sigma_{\bar{x}}$, is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{117.9}{322,000} (323.5)} = 0.3 \text{ minutes}$$

Consequently, the 68-percent confidence interval is estimated to be from 19.6 to 20.2 minutes, the 90-percent confidence interval is from 19.4 to 20.4 minutes, and the 95-percent confidence interval is from 19.3 to 20.5 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the Paterson-Clifton-Passaic, N.J. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

(68 chances out of 100)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	120	100	120	50,000.....	2,370	1,990	2,360
100.....	120	100	120	75,000.....	2,860	2,240	2,840
200.....	150	140	150	100,000.....	3,260	2,330	3,220
500.....	240	230	240	150,000.....	3,890	2,100	3,810
700.....	290	270	290	200,000.....	4,360	970	4,240
1,000.....	340	320	340	250,000.....	4,730	-	4,550
2,500.....	540	510	540	500,000.....	5,530	-	4,850
5,000.....	770	710	770	800,000.....	4,670	-	1,890
10,000.....	1,080	990	1,080	1,000,000.....	2,150	-	-
25,000.....	1,700	1,510	1,690				

Table A-2. Standard Errors for Estimated Percentage of Workers in the Paterson-Clifton-Passaic, N.J. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	54.1	54.1	54.1	54.1	54.1	54.3
200.....	37.1	37.1	37.1	37.1	37.1	38.4
500.....	19.1	19.1	19.1	19.1	21.0	24.3
700.....	14.4	14.4	14.4	14.4	17.8	20.5
1,000.....	10.5	10.5	10.5	10.5	14.9	17.2
2,500.....	4.5	4.5	4.7	6.5	9.4	10.9
5,000.....	2.3	2.3	3.3	4.6	6.6	7.7
10,000.....	1.2	1.2	2.4	3.3	4.7	5.4
25,000.....	0.5	0.7	1.5	2.1	3.0	3.4
50,000.....	0.2	0.5	1.1	1.5	2.1	2.4
75,000.....	0.2	0.4	0.9	1.2	1.7	2.0
100,000.....	0.12	0.3	0.7	1.0	1.5	1.7
150,000.....	0.08	0.3	0.6	0.8	1.2	1.4
200,000.....	0.06	0.2	0.5	0.7	1.1	1.2
250,000.....	0.05	0.2	0.5	0.7	0.9	1.1
500,000.....	0.02	0.15	0.3	0.5	0.7	0.8
800,000.....	0.01	0.12	0.3	0.4	0.5	0.6
1,000,000.....	0.01	0.11	0.2	0.3	0.5	0.5

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person	(240)	Line number of respondent	(241)	If last worker in this household, mark this box →
7a. What is ...'s principal means of transportation to work?	(242) <input type="checkbox"/> Truck <input type="checkbox"/> Car or carpool } →	(243) <input type="checkbox"/> Drives alone – Skip to 8a <input type="checkbox"/> Shares driving <input type="checkbox"/> Drives others <input type="checkbox"/> Rides with someone else } Skip to 7c		
	<input type="checkbox"/> Walks only – Skip to 8a <input type="checkbox"/> Works at home – Skip to 12a <input type="checkbox"/> Railroad <input type="checkbox"/> Subway or elevated <input type="checkbox"/> Bus or streetcar <input type="checkbox"/> Taxicab <input type="checkbox"/> Motorcycle <input type="checkbox"/> Bicycle <input type="checkbox"/> Other means – Specify _____			
b. Does ... usually ALSO use a car for part of the trip to work?	(244) <input type="checkbox"/> Yes <input type="checkbox"/> No – Skip to 8a			
c. How many people, including ..., usually ride in the car to work?	(245) _____ Number			
8a. Does ... usually WORK at the same location each day?	(246) <input type="checkbox"/> Yes – Skip to 8c <input type="checkbox"/> No			
b. Does ... usually REPORT to the same location to begin work each day?	(247) <input type="checkbox"/> Yes <input type="checkbox"/> No – Skip to 12a			
c. Where is ...'s usual place of work?	(1) Company or business establishment name _____ _____			
	(2) Address (Number and street) Note – If address (number and street name) are not known, enter building name, shopping center name, or other physical location description. _____ _____			
	(3) Names of nearest intersecting streets _____ _____			
	(4) Name of city, town, village, borough, etc. _____ Place type → _____			
	(5) County _____ State ZIP code _____			
8d. Was ...'s place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c4)?	(248) <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know			
9. What time does ... usually leave for work?	(249) _____ Time (250) <input type="checkbox"/> a.m. <input type="checkbox"/> p.m.			
10. How long does it usually take ... to get from home to work?	(251) _____ Minutes			
11. What is ...'s ONE-WAY distance from home to work?	(252) _____ Miles OR <input type="checkbox"/> Less than 1 mile			
12a. In the last year, has ... changed his principal means of transportation to work?	(253) <input type="checkbox"/> Yes <input type="checkbox"/> No – Skip to 13			
b. What was ...'s principal means of transportation to work (prior to the change)?	(254) <input type="checkbox"/> Truck <input type="checkbox"/> Car or carpool } →			
	(255) <input type="checkbox"/> Drove alone <input type="checkbox"/> Shared driving <input type="checkbox"/> Drove others <input type="checkbox"/> Rode with someone else <input type="checkbox"/> Walked only <input type="checkbox"/> Worked at home <input type="checkbox"/> Railroad <input type="checkbox"/> Subway or elevated <input type="checkbox"/> Bus or streetcar <input type="checkbox"/> Taxicab <input type="checkbox"/> Motorcycle <input type="checkbox"/> Bicycle <input type="checkbox"/> Other means – Specify _____			
13. If "Yes" marked in 12a – ASK Compared to ...'s previous means of transportation to work (Given in 12b), how satisfied is ... with his present means of transportation to work – much more, more, about the same, less or much less satisfied?	(256) <input type="checkbox"/> Much more satisfied <input type="checkbox"/> More satisfied <input type="checkbox"/> About the same satisfaction <input type="checkbox"/> Less satisfied <input type="checkbox"/> Much less satisfied <input type="checkbox"/> Don't know <input type="checkbox"/> Did not work last year			If "No" marked in 12a – ASK Compared to a year ago, how satisfied is ... now with his principal means of transportation to work – much more, more, about the same, less or much less satisfied? ←

Appendix C—Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker *usually* carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "--" means "rounds to or represents zero." Three dots "..." means "not applicable."

World Population 1977

Recent Demographic Estimates for the Countries and Regions of the World



This publication presents reported and estimated demographic data for the 200 countries of the world with a population of at least 5,000 persons, and for world regions. Benchmark, or hard, data for each country include the enumerated and adjusted population from the latest census or survey, birth and death rates, annual rate of growth, life expectancy at birth, infant mortality rate, percent of population under age 15, median age of mother, median birth order, percent urban, and percent of labor force in agriculture. A projected estimate of the population of each country for 1977 as well as birth and death rates and the annual rate of growth for 1976 are shown. All benchmark data and projected estimates are annotated, and major sources are listed. Also included for each country are population figures for each census taken since 1950, and an annual series of population estimates for the years 1950 to 1977.

This report was prepared under a Resources Support Services Agreement with the Development Support Bureau, U.S. Agency for International Development.

**U.S. Department of Commerce
BUREAU OF THE CENSUS**

For every 10 people in the world today, four live in China or India. Add the Soviet Union and the United States, and half the World's population is covered. The other half of the world's people are distributed among the remaining 196 countries and territories. Throughout the world, a perceptible decline in population growth rates has begun to emerge, with the persistent exception of Africa. In some areas the decrease is substantial, in others incipient; in general the decrease is no longer questionable. Over 70 percent of the world's population lives in countries where the growth rate was lower in 1976 than in 1966.

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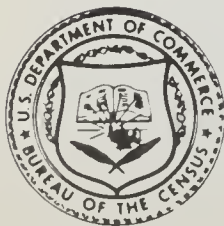
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U.S. Department of Commerce
BUREAU OF THE CENSUS

Series P-23, No. 91
Issued August 1979

Special Studies

Selected Characteristics of Travel to Work in the Milwaukee SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the Milwaukee SMSA completed during the period from April through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

In the Milwaukee SMSA in 1975, approximately 193,000 workers lived and worked in the suburbs, while a comparable figure of about 190,000 workers both lived and worked in Milwaukee city (table 1). In contrast, only about 99,000 workers who lived in the suburbs commuted into Milwaukee to work and only about 69,000 of the workers who lived in Milwaukee made the reverse trip from the city to suburban employment.

MEANS OF TRANSPORTATION TO WORK

Of the approximately 600,000 workers living in the Milwaukee SMSA in 1975, the survey results show that the majority (63 percent) usually drove to work alone (table 2). The proportion who carpooled to work (20 percent) was much larger than the proportion who used public transportation (about 8 percent), while 6 percent walked, 2 percent worked at home, and 1 percent used other means. Workers who lived in the suburbs were more likely to drive alone to work (69 percent) than residents of the city (57 percent),

while workers who lived in Milwaukee were more likely to use public transportation (13 percent) than suburban residents (2 percent).

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were more likely than men to carpool or use public transportation (table 3).

Race. Black workers showed a lower incidence of driving alone (about 52 percent) than White¹ workers (64 percent), and a correspondingly higher incidence of using public transportation (23 percent compared with 6 percent). The proportion of Blacks and Whites who traveled in carpools was not significantly different (table 3).

Household relationship. Female household heads were much less likely to drive alone to work and much more likely to use public transportation than male household heads in 1975 (table 3). Comparing working wives with female household heads, the data indicate that the wives were more likely to drive alone or carpool, and less likely to use public transit than female heads of households. Twenty-two percent of the female heads used public transportation compared with 8 percent of the working wives.

Earnings. Comparing the three most widely used means of transportation, workers who drove alone to work had the highest median earnings (\$10,754), followed by workers in carpools (\$9,049) and users of public transit (\$5,543).

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was about 7 miles in 1975 (table 4). Mean distance to work was very similar for workers who drove alone or carpoled (about 8 miles), while workers who used public transportation traveled about 6 miles on the average, to get to work.

Travel time by means of transportation. The average commuting trip in the SMSA took about 19 minutes in 1975 (table 5). Workers who drove alone took about 17 minutes to get to work, while the figure for those who carpoled was 19 minutes. Public transportation users, on the other hand, spent an average of about 35 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 4,931 sample households in the Milwaukee SMSA were eligible to answer the inquiries contained in the Travel-to-Work Supplement. The interviews resulted in responses from 10,279 workers 14

years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons, the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)

Albany-Schenectady-Troy, N.Y.
Anaheim-Santa Ana-Garden Grove,
Calif.
Boston, Mass.*
Dallas, Tex.
Detroit, Mich.*
Fort Worth, Tex.
Los Angeles-Long Beach, Calif.*
Madison, Wis.†
Memphis, Tenn.-Ark.
Minneapolis-St. Paul, Minn.
Newark, N.J.
Orlando, Fla.
Phoenix, Ariz.
Pittsburgh, Pa.
Saginaw, Mich.
Salt Lake City, Utah
Spokane, Wash.
Tacoma, Wash.
Washington, D.C.-Md.-Va.*
Wichita, Kans.

SURVEY GROUP II (1975 to 1976)

Atlanta, Ga.*
Chicago, Ill.*
Cincinnati, Ohio-Ky.-Ind.
Colorado Springs, Colo.
Columbus, Ohio
Hartford, Conn.
Kansas City, Mo.-Kans.
Miami, Fla.
Milwaukee, Wis.
New Orleans, La.
Newport News-Hampton, Va.
Paterson-Clifton-Passaic, N.J.
Philadelphia, Pa.-N.J.*
Portland, Oreg.-Wash.
Rochester, N.Y.
San Antonio, Tex.
San Bernardino-Riverside-Ontario,
Calif.
San Diego, Calif.
San Francisco-Oakland, Calif.*
Springfield-Chicopee-Holyoke,
Mass.-Conn.

SURVEY GROUP III (1976 to 1977)

Allentown-Bethlehem-Easton, Pa.-N.J.
Baltimore, Md.
Birmingham, Ala.
Buffalo, N.Y.
Cleveland, Ohio
Denver, Colo.
Grand Rapids, Mich.
Honolulu, Hawaii
Houston, Tex.*
Indianapolis, Ind.
Las Vegas, Nev.
Louisville, Ky.-Ind.
New York, N.Y.*
Oklahoma City, Okla.
Omaha, Nebr.-Iowa
Providence-Pawtucket-Warwick, R.I.-
Mass.
Raleigh, N.C.
Sacramento, Calif.
St. Louis, Mo.-Ill.*
Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units

† Included with Group II for the first (1975-76) enumeration

SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group III are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the Milwaukee SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside the SMSA			Outside the SMSA		
			Total	Milwaukee city	Outside central city			
SMSA.....	602	555	551	289	262	4	45	2
Milwaukee city.....	278	260	259	190	69	1	17	1
Outside central city.....	324	295	292	99	193	3	28	2
PERCENT DISTRIBUTION								
SMSA.....	[100.0]	100.0	99.2	52.1	47.1	0.8	[7.4]	[0.4]
Milwaukee city.....	[100.0]	100.0	99.7	73.2	26.5	0.3	[6.1]	[0.3]
Outside central city.....	[100.0]	100.0	98.9	33.5	65.3	1.1	[8.5]	[0.5]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the Milwaukee SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	602	278	324	100.0	100.0	100.0
Auto or truck.....	502	215	287	83.4	77.4	88.5
Drives alone.....	381	158	224	63.3	56.9	68.9
Carpool.....	121	57	64	20.0	20.5	19.6
Public transportation.....	45	37	8	7.5	13.4	2.4
Walks only.....	37	20	17	6.1	7.0	5.3
Other means.....	7	3	4	1.1	1.1	1.2
Bicycle.....	4	2	2	0.7	0.7	0.7
Motorcycle.....	2	1	1	0.4	0.3	0.4
All other means.....	1	-	-	0.1	-	-
Works at home.....	12	3	9	1.9	1.1	2.7

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the Milwaukee SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thou- sands)	Percent by means of transportation						
		Total	Auto or truck		Public trans- porta- tion	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	602	100.0	63.3	20.0	7.5	6.1	1.1	1.9
SEX								
Male.....	360	100.0	71.5	16.6	4.1	4.5	1.6	1.7
Female.....	242	100.0	51.2	25.1	12.5	8.4	0.5	2.3
RACE								
White and other.....	563	100.0	64.2	20.1	6.4	6.1	1.2	2.0
Black.....	39	100.0	51.5	18.2	23.3	6.4	-	0.8
HOUSEHOLD RELATIONSHIP								
Head.....	344	100.0	69.3	17.7	6.3	4.1	0.8	1.8
Male.....	290	100.0	73.5	17.3	3.4	3.2	0.9	1.8
Female.....	55	100.0	47.2	19.9	21.8	8.8	0.4	2.0
Wife of head.....	138	100.0	55.2	26.9	8.2	6.4	0.4	2.7
Other member.....	120	100.0	55.6	18.7	10.0	11.3	2.9	1.3
EARNINGS								
Without earnings or not reported.....	53	100.0	57.8	15.1	5.5	8.7	1.5	11.3
With earnings.....	549	100.0	63.9	20.5	7.7	5.8	1.1	1.0
\$1 to 5,999.....	178	100.0	53.2	19.1	13.0	10.8	1.9	2.0
\$6,000 to 9,999.....	113	100.0	56.6	25.4	10.7	5.5	1.0	0.6
\$10,000 to 14,999.....	149	100.0	71.6	20.5	3.9	2.9	0.5	0.5
\$15,000 to 24,999.....	91	100.0	76.8	18.6	1.2	2.2	0.7	0.5
\$25,000 or more.....	18	100.0	85.8	11.9	-	1.1	0.6	0.6
Median earnings.....	\$9,400	...	\$10,754	\$9,049	\$5,543	\$4,192	\$4,792	\$3,039
Mean earnings.....	\$9,752	...	\$10,899	\$9,216	\$5,850	\$5,618	\$6,176	\$5,611

Table 4. Principal Means of Transportation, by Distance to Work, for the Milwaukee SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	546	100.0	10.6	16.0	16.9	29.4	14.3	9.3	3.4	0.3	5.6	7.1
Drives alone.....	344	100.0	5.6	15.8	17.4	31.0	15.6	10.5	3.7	0.3	6.3	7.8
Carpool.....	116	100.0	4.4	15.8	16.7	31.1	16.4	11.2	4.3	0.2	6.6	8.1
Public transportation.....	44	100.0	2.5	18.0	26.0	38.7	11.4	2.1	1.1	-	4.9	5.7
Walks only.....	35	100.0	87.0	13.0	-	-	-	-	-	-	0.1	0.2
Other means.....	6	100.0	27.4	30.6	17.7	14.5	1.6	6.5	1.6	-	2.0	4.0

¹Excludes workers with no fixed place of work and workers who worked at home.**Table 5. Principal Means of Transportation, by Travel Time to Work, for the Milwaukee SMSA**

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	546	100.0	18.5	17.5	36.7	6.2	12.5	6.2	0.5	1.9	18.3	18.5
Drives alone.....	344	100.0	18.2	19.2	39.0	6.5	11.6	4.7	0.2	0.7	17.7	17.2
Carpool.....	116	100.0	14.0	16.8	40.3	7.7	13.7	5.7	0.7	1.1	19.3	19.0
Public transportation.....	44	100.0	1.4	5.0	22.3	6.2	23.2	23.9	3.0	15.0	32.7	34.8
Walks only.....	35	100.0	53.7	19.5	21.8	0.3	3.7	0.8	-	-	8.9	9.4
Other means.....	6	100.0	40.3	11.3	25.8	3.2	12.9	3.2	-	1.6	13.7	14.7

¹Excludes workers with no fixed place of work and workers who worked at home.

Appendix A — Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 4,931 housing units were eligible for interview in AHS. Of these sample units, 204 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 298 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 10,317 persons 14 years and older. Of these, 38 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is not 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{Weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA, a noninterview factor was computed separately for 56 noninterview cells.

A ratio estimation procedure was then employed for all sample housing units from the permit-issuing universe. This factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement, the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, a person ratio estimate factor was calculated for each sector.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 4,000 conventional new construction units and 1,000 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and

nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 and A-2 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These estimates

of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 242,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 4,760. Consequently, the 68-percent confidence interval, as shown by these data, is from 237,240 to 246,760. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 234,380 to 249,620 workers with 90-percent confidence and within the interval from 232,480 to 251,520 with 95-percent confidence.

Table 3 also shows that of the 242,000 female workers, 12.5 percent commuted by means of public transportation. Interpolation in table A-2 of the appendix shows that the standard error of this percent is approximately 0.8 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 11.7 to 13.3 percent; the 90-percent confidence interval is from 11.2 to 13.8 percent; and the 95-percent confidence interval is from 10.9 to 14.1 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 4.1 percent of the male workers in this SMSA commuted by means of public transportation. Thus, the apparent difference, as shown by these data, between the percent of public transportation use by males and females is 8.4 percent. Table A-2 of the appendix shows the standard error of 4.1 percent on a base of 360,000 is approximately 0.4 percent, while the standard error of 12.5 percent is approximately 0.8 percent. Therefore, the standard error of the estimated difference of 8.4 percent is about

$$0.9 = \sqrt{(0.4)^2 + (0.8)^2}$$

Consequently, the 68-percent confidence interval for the 8.4 percent difference is from 7.5 to 9.3 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 7.0 to 9.8 percent, and the 95-percent confidence interval is from 6.6 to 10.2 percent. Thus, we can conclude with 95-percent confidence that the percentage of female workers who used public transportation in 1975 is greater than the percentage of male workers who used transit, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

1. Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.
2. Add to and subtract from 50 percent the standard error determined in step 1.
3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 17.7 minutes.

1. Using table A-2 of the appendix, the standard error of 50 percent on a base of 344,000 is found to be about 1.0 percent.
2. A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 48.0 and 52.0.
3. The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 37.4 percent of the persons fall in the intervals below the median interval, while 39.0 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{48.0 - 37.4}{39.0} \right) = 17.2$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{52.0 - 37.4}{39.0} \right) = 18.2$$

Thus, the 95-percent confidence interval on the estimated median is from 17.2 to 18.2 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} S^2}$$

where y is the size of the base, and b is a parameter which equals 121.8 for this SMSA, 118.9 for the central city, and 125.7 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for group

i ; and $\bar{X}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{X}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 17.2 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min. . . .	.182	4.5
10 to 14 min. . . . .	.192	12.0
15 to 24 min. . . . .	.390	19.5
25 to 29 min. . . . .	.065	27.0
30 to 34 min. . . . .	.116	32.0
35 to 49 min. . . . .	.047	42.0
50 to 59 min. . . . .	.002	54.5
60 min. or more . . . .	.007	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 133.8$$

The b parameter is equal to 121.8. Thus the standard error on 17.2 minutes, $\sigma_{\bar{x}}$, is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{121.8}{344,000} (133.8)} = 0.2 \text{ minutes}$$

Consequently, the 68-percent confidence interval is estimated to be from 17.0 to 17.4 minutes, the 90-percent confidence interval is from 16.9 to 17.5 minutes, and the 95-percent confidence interval is from 16.8 to 17.6 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the Milwaukee, Wisc. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

(68 chances out of 100)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	120	120	130	25,000.....	1,720	1,680	1,730
100.....	120	120	130	50,000.....	2,410	2,310	2,390
200.....	160	150	160	75,000.....	2,910	2,750	2,860
500.....	250	240	250	100,000.....	3,320	3,090	3,220
700.....	290	290	300	150,000.....	3,960	3,540	3,720
1,000.....	350	340	350	250,000.....	4,830	3,860	4,190
2,500.....	550	540	560	500,000.....	5,690	380	2,720
5,000.....	780	770	790	1,000,000.....	2,790	-	-
10,000.....	1,100	1,080	1,110				

Table A-2. Standard Errors for Estimated Percentage of Workers in the Milwaukee, Wisc. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	54.9	54.9	54.9	54.9	54.9	55.2
200.....	37.8	37.8	37.8	37.8	37.8	39.0
500.....	19.6	19.6	19.6	19.6	21.4	24.7
700.....	14.8	14.8	14.8	14.8	18.1	20.9
1,000.....	10.9	10.9	10.9	10.9	15.1	17.4
2,500.....	4.6	4.6	4.8	6.6	9.6	11.0
5,000.....	2.4	2.4	3.4	4.7	6.8	7.8
10,000.....	1.2	1.2	2.4	3.3	4.8	5.5
25,000.....	0.5	0.7	1.5	2.1	3.0	3.5
50,000.....	0.2	0.5	1.1	1.5	2.1	2.5
75,000.....	0.2	0.4	0.9	1.2	1.7	2.0
100,000.....	0.12	0.3	0.8	1.0	1.5	1.7
150,000.....	0.08	0.3	0.6	0.9	1.2	1.4
250,000.....	0.05	0.2	0.5	0.7	1.0	1.1
500,000.....	0.02	0.2	0.3	0.5	0.7	0.8
1,000,000.....	0.01	0.11	0.2	0.3	0.5	0.6

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person		Line number of respondent	
	(240)		(241)
7a. What is ...'s principal means of transportation to work?		8d. Was ...'s place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c4)?	
(242) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } →		(248) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Don't know	
(243) 1 <input type="checkbox"/> Drives alone – Skip to 8a 2 <input type="checkbox"/> Shares driving } 3 <input type="checkbox"/> Drives others } Skip to 7c 4 <input type="checkbox"/> Rides with someone else } 5 <input type="checkbox"/> Walks only – Skip to 8a 6 <input type="checkbox"/> Works at home – Skip to 12a 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means – Specify _____		9. What time does ... usually leave for work? (249) _____ Time (250) 1 <input type="checkbox"/> a.m. 2 <input type="checkbox"/> p.m.	
b. Does ... usually ALSO use a car for part of the trip to work?		10. How long does it usually take ... to get from home to work?	
(244) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No – Skip to 8a		(251) _____ Minutes	
c. How many people, including ..., usually ride in the car to work?		11. What is ...'s ONE-WAY distance from home to work?	
(245) _____ Number		(252) _____ Miles OR 0 <input type="checkbox"/> Less than 1 mile	
8a. Does ... usually WORK at the same location each day?		12a. In the last year, has ... changed his principal means of transportation to work?	
(246) 1 <input type="checkbox"/> Yes – Skip to 8c 2 <input type="checkbox"/> No		(253) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No – Skip to 13	
b. Does ... usually REPORT to the same location to begin work each day?		b. What was ...'s principal means of transportation to work (prior to the change)?	
(247) 3 <input type="checkbox"/> Yes 4 <input type="checkbox"/> No – Skip to 12a		(254) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } →	
c. Where is ...'s usual place of work?		(255) 1 <input type="checkbox"/> Drove alone 2 <input type="checkbox"/> Shared driving 3 <input type="checkbox"/> Drove others 4 <input type="checkbox"/> Rode with someone else 5 <input type="checkbox"/> Walked only 6 <input type="checkbox"/> Worked at home 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means – Specify _____	
(1) Company or business establishment name _____ _____ _____		13. If "Yes" marked in 12a – ASK Compared to ...'s previous means of transportation to work (Given in 12b), how satisfied is ... with his present means of transportation to work – much more, more, about the same, less or much less satisfied?	
(2) Address (Number and street) Note – If address (number and street name) are not known, enter building name, shopping center name, or other physical location description. _____ _____ _____		If "No" marked in 12a – ASK Compared to a year ago, how satisfied is ... now with his principal means of transportation to work – much more, more, about the same, less or much less satisfied? _____ _____ _____	
(3) Names of nearest intersecting streets _____ _____ _____		(256) 1 <input type="checkbox"/> Much more satisfied 2 <input type="checkbox"/> More satisfied 3 <input type="checkbox"/> About the same satisfaction 4 <input type="checkbox"/> Less satisfied 5 <input type="checkbox"/> Much less satisfied 6 <input type="checkbox"/> Don't know 7 <input type="checkbox"/> Did not work last year	
(4) Name of city, town, village, borough, etc. _____ _____ _____			
(5) County _____ _____ _____			
State ZIP code _____ _____		INTERVIEWER Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a–e on page 19 of AHS-52 questionnaire.	

Appendix C—Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker *usually* carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "-" means "rounds to or represents zero." Three dots "..." means "not applicable."

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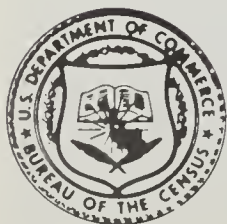
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BUREAU OF THE CENSUS

Series P-23, No. 92
Issued September 1979

Selected Characteristics of Travel to Work in the San Diego SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the San Diego SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the SMSA in 1975, about 213,000 workers, was comprised of persons who lived and worked in San Diego city (table 1). In comparison, about 165,000 workers both lived and worked in the suburbs. Approximately 92,000 of the workers who lived in the suburbs commuted into San Diego to work, while about 40,000 of the workers who lived in San Diego made the reverse trip from the city to suburban employment.

MEANS OF TRANSPORTATION TO WORK

Of the approximately 569,000 workers living in the San Diego SMSA in 1975, the survey results show that a large majority (71 percent) usually drove to work alone (table 2). The proportion who carpooled to work (17 percent) was much larger than the proportion who used public transportation (about 4 percent), while 3 percent walked, 3 percent used other means, and 2 percent worked at home. Comparing city and suburban residents, the data indicate that the rate of carpooling was higher among workers who lived outside the central city (20 percent compared with 14 percent), while workers who lived in San Diego were more

likely to use public transportation (about 6 percent) than suburban residents (1 percent).

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were somewhat more likely than men to use public transportation (table 3). The difference between males and females in the rate of carpooling, however, was not significant.

Race. Black workers showed a lower incidence of driving alone (about 59 percent) than White¹ workers (72 percent), and a correspondingly higher incidence of using public transportation (12 percent compared with 3 percent). In addition, there is some evidence that Black workers in the San Diego SMSA had a higher rate of carpooling to work (23 percent) than White workers (17 percent).

Household relationship. Female household heads were less likely to carpool to work and more likely to use public transportation than male household heads in 1975 (table 3), but the difference between the two groups in the rate of driving alone was not significant. Comparing working wives with female household heads, the data indicate that the wives were less likely to drive alone or use public transit, and more likely to carpool than female heads of households. Twenty-two percent of the working wives rode to work in carpools compared with about 10 percent of the female household heads.

Earnings. Comparing the three major means of transportation, workers who drove alone to work had the highest median earnings (\$9,354), followed by workers in carpools (\$8,332) and users of public transit (\$4,733).

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was about 10 miles in 1975 (table 4). Mean distance to work for workers who used public transportation was about 8 miles, while workers who drove alone traveled about 10 miles on the average to get to work. Workers in carpools had the longest average trips in San Diego in 1975, almost 13 miles.

Travel time by means of transportation. The average commuting trip in the SMSA took about 19 minutes in 1975 (table 5). Workers who drove alone spent an average of 18 minutes getting to work, while the figure for carpools was 22 minutes. Public transportation users, on the other hand, spent an average of about 35 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 4,556 sample households in the San Diego SMSA were eligible to answer the inquiries contained in the Travel-to-Work Supplement.

The interviews resulted in responses from 8,474 workers 14 years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)	SURVEY GROUP II (1975 to 1976)	SURVEY GROUP III (1976 to 1977)
Albany-Schenectady-Troy, N.Y.	Atlanta, Ga.*	Allentown-Bethlehem-Easton, Pa.-N.J.
Anaheim-Santa Ana-Garden Grove, Calif.	Chicago, Ill.*	Baltimore, Md.
Boston, Mass.*	Cincinnati, Ohio-Ky.-Ind.	Birmingham, Ala.
Dallas, Tex.	Colorado Springs, Colo.	Buffalo, N.Y.
Detroit, Mich.*	Columbus, Ohio	Cleveland, Ohio
Fort Worth, Tex.	Hartford, Conn.	Denver, Colo.
Los Angeles-Long Beach, Calif.*	Kansas City, Mo.-Kans.	Grand Rapids, Mich.
Madison, Wis.†	Miami, Fla.	Honolulu, Hawaii
Memphis, Tenn.-Ark.	Milwaukee, Wis.	Houston, Tex.*
Minneapolis-St. Paul, Minn.	New Orleans, La.	Indianapolis, Ind.
Newark, N.J.	Newport News-Hampton, Va.	Las Vegas, Nev.
Orlando, Fla.	Paterson-Clifton-Passaic, N.J.	Louisville, Ky.-Ind.
Phoenix, Ariz.	Philadelphia, Pa.-N.J.*	New York, N.Y.*
Pittsburgh, Pa.	Portland, Oreg.-Wash.	Oklahoma City, Okla.
Saginaw, Mich.	Rochester, N.Y.	Omaha, Nebr.-Iowa
Salt Lake City, Utah	San Antonio, Tex.	Providence-Pawtucket-Warwick, R.I.-Mass.
Spokane, Wash.	San Bernardino-Riverside-Ontario, Calif.	Raleigh, N.C.
Tacoma, Wash.	San Diego, Calif.	Sacramento, Calif.
Washington, D.C.-Md.-Va.*	San Francisco-Oakland, Calif.*	St. Louis, Mo.-Ill.*
Wichita, Kans.	Springfield-Chicopee-Holyoke, Mass.-Conn.	Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group III are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the San Diego SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside the SMSA			Outside the SMSA		
			Total	San Diego city	Outside central city			
SMSA.....	569	513	510	305	205	4	52	3
San Diego city.....	283	254	253	213	40	1	27	2
Outside central city.....	286	259	257	92	165	3	25	2
PERCENT DISTRIBUTION								
SMSA.....	[100.0]	100.0	99.3	59.4	39.9	0.7	[9.2]	[0.6]
San Diego city.....	[100.0]	100.0	99.5	83.7	15.8	0.5	[9.6]	[0.6]
Outside central city.....	[100.0]	100.0	99.0	35.6	63.5	1.0	[8.9]	[0.6]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the San Diego SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	569	283	286	100.0	100.0	100.0
Auto or truck.....	501	244	257	88.0	86.4	89.6
Drives alone.....	405	204	200	71.0	72.3	70.0
Carpool.....	96	40	56	16.9	14.1	19.7
Public transportation.....	20	16	4	3.6	5.8	1.4
Walks only.....	17	8	9	3.1	2.9	3.2
Other means.....	18	10	7	3.1	3.6	2.6
Bicycle.....	7	4	3	1.3	1.4	1.2
Motorcycle.....	9	5	4	1.5	1.8	1.3
All other means.....	2	1	-	0.3	0.5	-
Works at home.....	13	4	9	2.2	1.3	3.2

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the San Diego SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thou- sands)	Percent by means of transportation						
		Total	Auto or truck		Public trans- porta- tion	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	569	100.0	71.1	16.9	3.6	3.1	3.1	2.2
SEX								
Male.....	355	100.0	72.5	16.4	2.6	2.5	4.1	1.7
Female.....	214	100.0	68.8	17.7	5.1	3.9	1.4	3.1
RACE								
White and other.....	549	100.0	71.5	16.7	3.2	3.1	3.2	2.3
Black.....	20	100.0	58.8	23.1	12.1	2.5	1.5	2.0
HOUSEHOLD RELATIONSHIP								
Head.....	361	100.0	74.6	15.3	3.1	2.5	2.8	1.7
Male.....	304	100.0	74.7	16.3	2.2	2.0	3.1	1.7
Female.....	57	100.0	73.8	9.8	8.0	5.1	1.4	1.9
Wife of head.....	117	100.0	67.6	22.0	3.1	3.2	0.9	3.2
Other member.....	92	100.0	61.9	17.0	5.9	5.0	7.1	3.2
EARNINGS								
Without earnings or not reported.....	83	100.0	67.0	13.2	4.1	4.2	3.1	8.3
With earnings.....	486	100.0	71.8	17.5	3.5	2.9	3.1	1.2
\$1 to 5,999.....	167	100.0	63.8	17.6	6.3	5.4	4.6	2.3
\$6,000 to 9,999.....	112	100.0	71.3	19.6	3.1	2.6	2.8	0.4
\$10,000 to 14,999.....	110	100.0	77.2	17.5	1.6	0.9	2.1	0.6
\$15,000 to 24,999.....	77	100.0	80.2	15.1	1.3	0.9	2.1	0.5
\$25,000 or more	19	100.0	79.4	14.4	0.5	1.5	2.1	2.1
Median earnings.....	\$8,617	...	\$9,354	\$8,332	\$4,733	\$4,371	\$5,802	\$5,389
Mean earnings.....	\$9,727	...	\$10,355	\$9,305	\$5,679	\$3,768	\$7,162	\$7,088

Table 4. Principal Means of Transportation, by Distance to Work, for the San Diego SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	504	100.0	6.4	10.4	11.5	26.0	20.7	19.0	5.3	0.6	8.7	9.9
Drives alone.....	363	100.0	4.0	10.4	11.6	28.4	21.3	19.0	4.8	0.5	8.7	9.9
Carpool.....	91	100.0	2.2	5.5	11.3	21.8	23.1	26.1	9.1	0.9	11.5	12.6
Public transportation.....	19	100.0	1.6	15.3	19.6	29.6	21.7	9.5	2.6	-	6.8	7.9
Walks only.....	16	100.0	86.0	14.6	-	-	-	-	-	-	0.1	0.2
Other means.....	15	100.0	14.3	30.5	13.6	15.6	11.0	10.4	3.2	1.9	3.3	7.1

¹Excludes workers with no fixed place of work and workers who worked at home.**Table 5. Principal Means of Transportation, by Travel Time to Work, for the San Diego SMSA**

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	504	100.0	16.6	16.3	39.0	6.5	12.9	6.7	0.3	1.7	18.9	18.8
Drives alone.....	363	100.0	17.1	17.4	41.5	6.4	11.7	4.9	0.2	0.9	18.2	17.7
Carpool.....	91	100.0	9.7	13.8	35.8	8.8	17.7	11.8	0.6	1.8	21.9	22.0
Public transportation.....	19	100.0	5.3	5.3	22.8	2.6	21.2	22.8	1.6	18.5	32.8	35.2
Walks only.....	16	100.0	55.4	13.4	25.5	0.6	4.5	0.6	-	-	8.6	9.2
Other means.....	15	100.0	20.8	22.7	35.1	3.9	10.4	5.2	-	1.9	16.3	17.6

¹Excludes workers with no fixed place of work and workers who worked at home.

Appendix A—Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 4,556 housing units were eligible for interview in AHS. Of these sample units, 212 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or, for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 352 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 8,542 persons 14 years and older. Of these, 68 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{Weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA, a noninterview factor was computed separately for 56 noninterview cells.

A ratio estimation procedure was then employed for all sample housing units from the permit-issuing universe. This factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement, the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, a person ratio estimate factor was calculated for each sector.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 8,900 conventional new construction units and 13,400 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and

nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 and A-2 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These

estimates of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 214,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 4,890. Consequently, the 68-percent confidence interval, as shown by these data, is from 209,110 to 218,890. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 206,180 to 221,820 workers with 90-percent confidence and within the interval from 204,220 to 223,780 with 95-percent confidence.

Table 3 also shows that of the 214,000 female workers, 5.1 percent commuted by means of public transportation. Interpolation in table A-2 of the appendix shows that the standard error of this percent is approximately 0.6 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 4.5 to 5.7 percent; the 90-percent confidence interval is from 4.1 to 6.1 percent; and the 95-percent confidence interval is from 3.9 to 6.3 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 2.6 percent of the male workers in this SMSA commuted by means of public transportation. Thus, the apparent difference, as shown by these data, between the percentage of public transportation use between males and females is 2.5 percent. Table A-2 of the appendix shows the standard error of 2.6 percent on a base of 355,000 is approximately 0.3 percent, while the standard error of 5.1 percent is approximately 0.6 percent. Therefore, the standard error of the estimated difference of 2.5 percent is about

$$0.7 = \sqrt{(0.6)^2 + (0.3)^2}$$

Consequently, the 68-percent confidence interval for the 2.5 percent difference is from 1.8 to 3.2 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 1.4 to 3.6 percent, and the 95-percent confidence interval is from 1.1 to 3.9 percent. Thus, we can conclude with 95-percent confidence that the percentage of female workers who used public transportation in 1975 is greater than the percentage of male workers who used transit, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

1. Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.
2. Add to and subtract from 50 percent the standard error determined in step 1.
3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 18.2 minutes.

1. Using table A-2 of the appendix, the standard error of 50 percent on a base of 363,000 is found to be about 1.0 percent.
2. A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 48.0 and 52.0.
3. The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 34.5 percent of the persons fall in the intervals below the median interval, while 41.5 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{48.0 - 34.5}{41.5} \right) = 17.8$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{52.0 - 34.5}{41.5} \right) = 18.7$$

Thus, the 95-percent confidence interval on the estimated median is from 17.8 to 18.7 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} S^2}$$

where y is the size of the base, and b is a parameter which equals 140.5 for this SMSA, 146.2 for the central city, and 136.0 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for group i ; and $\bar{X}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{X}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 17.7 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min.	.171	4.5
10 to 14 min.	.174	12.0
15 to 24 min.	.415	19.5
25 to 29 min.	.064	27.0
30 to 34 min.	.117	32.0
35 to 49 min.	.049	42.0
50 to 59 min.	.002	54.5
60 min. or more	.009	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 141.4$$

The b parameter is equal to 140.5. Thus the standard error on 17.7 minutes, $\sigma_{\bar{x}}$, is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{140.5}{363,000} (141.4)} = 0.2 \text{ minutes}$$

Consequently, the 68-percent confidence interval is estimated to be from 17.5 to 17.9 minutes, the 90-percent confidence interval is from 17.4 to 18.0 minutes, and the 95-percent confidence interval is from 17.3 to 18.1 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the San Diego, Calif. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

(68 chances out of 100. For explanation of symbols, see text)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	140	150	140	25,000.....	1,850	1,870	1,800
100.....	140	150	140	50,000.....	2,590	2,580	2,490
200.....	170	170	160	75,000.....	3,140	3,080	2,980
500.....	270	270	260	100,000.....	3,580	3,460	3,360
700.....	310	320	310	150,000.....	4,280	4,000	3,900
1,000.....	370	380	370	250,000.....	5,240	4,480	4,420
2,500.....	590	600	580	500,000.....	6,280	2,670	3,160
5,000.....	840	850	820	1,000,000.....	4,160	-	-
10,000.....	1,180	1,200	1,160				

Table A-2. Standard Errors for Estimated Percentage of Workers in the San Diego, Calif. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	58.4	58.4	58.4	58.4	58.4	59.3
200.....	41.3	41.3	41.3	41.3	41.3	41.9
500.....	21.9	21.9	21.9	21.9	23.0	26.5
700.....	16.7	16.7	16.7	16.7	19.4	22.4
1,000.....	12.3	12.3	12.3	12.3	16.2	18.7
2,500.....	5.3	5.3	5.3	7.1	10.3	11.9
5,000.....	2.7	2.7	3.7	5.0	7.3	8.4
10,000.....	1.4	1.4	2.6	3.6	5.1	5.9
25,000.....	0.6	0.7	1.6	2.2	3.2	3.7
50,000.....	0.3	0.5	1.2	1.6	2.3	2.7
75,000.....	0.2	0.4	0.9	1.3	1.9	2.2
100,000.....	0.14	0.4	0.8	1.1	1.6	1.9
150,000.....	0.09	0.3	0.7	0.9	1.3	1.5
250,000.....	0.06	0.2	0.5	0.7	1.0	1.2
500,000.....	0.03	0.2	0.4	0.5	0.7	0.8
1,000,000.....	0.01	0.12	0.3	0.4	0.5	0.6

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person	(240)	Line number of respondent	(241)	If last worker in this household, mark this box <input type="checkbox"/>
7a. What is . . . 's principal means of transportation to work?				8d. Was . . . 's place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c(4))?
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>(242) 1 <input type="checkbox"/> Truck } } →</p> <p>2 <input type="checkbox"/> Car or carpool</p> </div> <div style="width: 45%;"> <p>(243) 1 <input type="checkbox"/> Drives alone — Skip to 8a</p> <p>2 <input type="checkbox"/> Shares driving }</p> <p>3 <input type="checkbox"/> Drives others } } → Skip to 7c</p> <p>4 <input type="checkbox"/> Rides with someone else</p> <p>5 <input type="checkbox"/> Walks only — Skip to 8a</p> <p>6 <input type="checkbox"/> Works at home — Skip to 12a</p> <p>7 <input type="checkbox"/> Railroad</p> <p>8 <input type="checkbox"/> Subway or elevated</p> <p>9 <input type="checkbox"/> Bus or streetcar</p> <p>10 <input type="checkbox"/> Taxicab</p> <p>11 <input type="checkbox"/> Motorcycle</p> <p>13 <input type="checkbox"/> Bicycle</p> <p>12 <input type="checkbox"/> Other means — Specify _____</p> </div> </div>				<p>(248) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Don't know</p>
b. Does . . . usually ALSO use a car for part of the trip to work?				9. What time does . . . usually leave for work?
<p>(244) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No — Skip to 8a</p>				<p>(249) _____ Time</p> <p>(250) 1 <input type="checkbox"/> a.m. 2 <input type="checkbox"/> p.m.</p>
c. How many people, including . . . , usually ride in the car to work?				10. How long does it usually take . . . to get from home to work?
<p>(245) _____ Number</p>				<p>(251) _____ Minutes</p>
8a. Does . . . usually WORK at the same location each day?				11. What is . . . 's ONE-WAY distance from home to work?
<p>(246) 1 <input type="checkbox"/> Yes — Skip to 8c 2 <input type="checkbox"/> No</p>				<p>(252) _____ Miles OR <input type="checkbox"/> Less than 1 mile</p>
b. Does . . . usually REPORT to the same location to begin work each day?				12a. In the last year, has . . . changed his principal means of transportation to work?
<p>(247) 3 <input type="checkbox"/> Yes 4 <input type="checkbox"/> No — Skip to 12a</p>				<p>(253) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No — Skip to 13</p>
c. Where is . . . 's usual place of work?				b. What was . . . 's principal means of transportation to work (prior to the change)?
<p>(1) Company or business establishment name</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(2) Address (Number and street)</p> <p>Note — If address (number and street name) are not known, enter building name, shopping center name, or other physical location description.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(3) Names of nearest intersecting streets</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(4) Name of city, town, village, borough, etc.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(5) County</p> <p>_____</p> <p>_____</p> <p>State ZIP code</p> <p>_____</p> <p>_____</p>				<p>(254) 1 <input type="checkbox"/> Truck }</p> <p>2 <input type="checkbox"/> Car or carpool } } →</p> <p>(255) 1 <input type="checkbox"/> Drove alone</p> <p>2 <input type="checkbox"/> Shared driving</p> <p>3 <input type="checkbox"/> Drove others</p> <p>4 <input type="checkbox"/> Rode with someone else</p> <p>5 <input type="checkbox"/> Walked only</p> <p>6 <input type="checkbox"/> Worked at home</p> <p>7 <input type="checkbox"/> Railroad</p> <p>8 <input type="checkbox"/> Subway or elevated</p> <p>9 <input type="checkbox"/> Bus or streetcar</p> <p>10 <input type="checkbox"/> Taxicab</p> <p>11 <input type="checkbox"/> Motorcycle</p> <p>13 <input type="checkbox"/> Bicycle</p> <p>12 <input type="checkbox"/> Other means — Specify _____</p>
13. If "Yes" marked in 12a — ASK Compared to . . . 's previous means of transportation to work (Given in 12b), how satisfied is . . . with his present means of transportation to work — much more, more, about the same, less or much less satisfied?				If "No" marked in 12a — ASK Compared to a year ago, how satisfied is . . . now with his principal means of transportation to work — much more, more, about the same, less or much less satisfied?
<p>(256) 1 <input type="checkbox"/> Much more satisfied</p> <p>2 <input type="checkbox"/> More satisfied</p> <p>3 <input type="checkbox"/> About the same satisfaction</p> <p>4 <input type="checkbox"/> Less satisfied</p> <p>5 <input type="checkbox"/> Much less satisfied</p> <p>6 <input type="checkbox"/> Don't know</p> <p>7 <input type="checkbox"/> Did not work last year</p>				
INTERVIEWER				<p>Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a-e on page 19 of AHS-52 questionnaire.</p>

Appendix C — Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker *usually* carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "-" means "rounds to or represents zero." Three dots "..." means "not applicable."

World Population 1977

Recent Demographic Estimates for the Countries and Regions of the World

Of every 10 people in the world today, four live in either China or India. Add the Soviet Union and the United States, and half the World's population is covered. The other half of the world's people are distributed among the remaining 196 countries and territories. Throughout the world, a perceptible decline in population growth rates has begun to emerge, with the persistent exception of Africa. In some areas the decrease is substantial, in others incipient; in general the decrease is no longer questionable. Over 70 percent of the world's population lives in countries where the growth rate was lower in 1976 than in 1966.



This publication presents reported and estimated demographic data for the 200 countries of the world with a population of at least 5,000 persons, and for world regions. Benchmark, or hard, data for each country include the enumerated and adjusted population from the latest census or survey, birth and death rates, annual rate of growth, life expectancy at birth, infant mortality rate, percent of population under age 15, median age of mother, median birth order, percent urban, and percent of labor force in agriculture. A projected estimate of the population of each country for 1977 as well as birth and death rates and the annual rate of growth for 1976 are shown. All benchmark data and projected estimates are annotated, and major sources are listed. Also included for each country are population figures for each census taken since 1950, and an annual series of population estimates for the years 1950 to 1977.

This report was prepared under a Resources Support Services Agreement with the Development Support Bureau, U.S. Agency for International Development.

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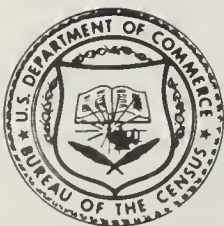
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U.S. Department of Commerce
BUREAU OF THE CENSUS

Series P-23, No. 93
Issued September 1979

Special Studies

Selected Characteristics of Travel to Work in the Miami SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the Miami SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the Miami SMSA in 1975, about 265,000 workers, was comprised of persons who both lived and worked in the suburbs (table 1). In comparison, about 86,000 of the persons who lived in the suburbs commuted into Miami to work. Among the residents of Miami there is some evidence that the number of persons who lived and worked in the city (67,000), was greater than the number who made the reverse trip from the city to suburban employment (61,000).

MEANS OF TRANSPORTATION TO WORK

Of the approximately 543,000 workers living in the Miami SMSA in 1975, the survey results show that the majority (66 percent) usually drove to work alone (table 2). The proportion who carpooled to work (21 percent) was much larger than the proportion who used public transportation (7 percent), while about 4 percent walked, and 1 percent each used other means and worked at home. Workers who lived in the suburbs were more likely to drive alone to work (70 percent) than residents of the city (56 percent), while

workers who lived in Miami were more likely to use public transportation (14 percent) than suburban residents (5 percent).

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were more likely than men to carpool or use public transportation (table 3).

Race. Black workers showed a lower incidence of driving alone (about 55 percent) than White¹ workers (68 percent), and a correspondingly higher incidence of using public transportation (20 percent compared with 5 percent). The difference between Black workers and White workers in the rate of carpooling, however, was not significant (table 3).

Household relationship. Female household heads were less likely to drive alone to work and more likely to use public transportation than male household heads in 1975 (table 3). Comparing working wives with female household heads, the data indicate that the latter were more likely to drive alone or use public transit, and less likely to carpool than working wives. Fifteen percent of the female household heads carpooled to work, compared with 31 percent of the working wives.

Earnings. Comparing the three most widely used means of transportation, workers who drove alone to work had the highest median earnings (\$9,233), followed by workers in carpools (\$6,116) and users of public transit (\$4,704).

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was about 9 miles in 1975 (table 4). Workers who drove alone or who used public transportation traveled about the average distance to get to work, while workers in carpools traveled slightly farther (10 miles).

Travel time by means of transportation. The average commuting trip in the SMSA took about 22 minutes in 1975 (table 5). Workers who drove alone spent an average of 20 minutes getting to work, while the figure for those who carpooled was 23 minutes. Public transportation users, on the other hand, spent an average of about 44 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 4,537 sample households in the Miami SMSA were eligible to answer the inquiries contained in the Travel-to-Work Supplement. The interviews resulted in responses from 8,227 workers 14 years

old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)	SURVEY GROUP II (1975 to 1976)	SURVEY GROUP III (1976 to 1977)
Albany-Schenectady-Troy, N.Y.	Atlanta, Ga.*	Allentown-Bethlehem-Easton, Pa.-N.J.
Anaheim-Santa Ana-Garden Grove, Calif.	Chicago, Ill.*	Baltimore, Md.
Boston, Mass.*	Cincinnati, Ohio-Ky.-Ind.	Birmingham, Ala.
Dallas, Tex.	Colorado Springs, Colo.	Buffalo, N.Y.
Detroit, Mich.*	Columbus, Ohio	Cleveland, Ohio
Fort Worth, Tex.	Hartford, Conn.	Denver, Colo.
Los Angeles-Long Beach, Calif.*	Kansas City, Mo.-Kans.	Grand Rapids, Mich.
Madison, Wis.†	Miami, Fla.	Honolulu, Hawaii
Memphis, Tenn.-Ark.	Milwaukee, Wis.	Houston, Tex.*
Minneapolis-St. Paul, Minn.	New Orleans, La.	Indianapolis, Ind.
Newark, N.J.	Newport News-Hampton, Va.	Las Vegas, Nev.
Orlando, Fla.	Paterson-Clifton-Passaic, N.J.	Louisville, Ky.-Ind.
Phoenix, Ariz.	Philadelphia, Pa.-N.J.*	New York, N.Y.*
Pittsburgh, Pa.	Portland, Oreg.-Wash.	Oklahoma City, Okla.
Saginaw, Mich.	Rochester, N.Y.	Omaha, Nebr.-Iowa
Salt Lake City, Utah	San Antonio, Tex.	Providence-Pawtucket-Warwick, R.I.-Mass.
Spokane, Wash.	San Bernardino-Riverside-Ontario, Calif.	Raleigh, N.C.
Tacoma, Wash.	San Diego, Calif.	Sacramento, Calif.
Washington, D.C.-Md.-Va.*	San Francisco-Oakland, Calif.*	St. Louis, Mo.-Ill.*
Wichita, Kans.	Springfield-Chicopee-Holyoke, Mass.-Conn.	Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group III are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the Miami SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside the SMSA			Outside the SMSA		
			Total	Miami city	Outside central city			
SMSA.....	543	490	479	152	326	11	50	3
Miami city.....	141	130	128	67	61	2	10	1
Outside central city.....	402	360	351	86	265	9	40	2
PERCENT DISTRIBUTION								
SMSA.....	[100.0]	100.0	97.8	31.1	66.6	2.2	[9.2]	[0.5]
Miami city.....	[100.0]	100.0	98.7	51.5	47.2	1.3	[7.3]	[0.6]
Outside central city.....	[100.0]	100.0	97.4	23.8	73.6	2.6	[9.9]	[0.5]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the Miami SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	543	141	402	100.0	100.0	100.0
Auto or truck.....	473	113	361	87.2	80.1	89.7
Drives alone.....	361	78	283	66.4	55.7	70.3
Carpool.....	112	34	78	20.7	24.5	19.4
Public transportation.....	38	19	19	7.0	13.8	4.7
Walks only.....	19	7	12	3.5	4.6	3.1
Other means.....	6	1	5	1.1	0.6	1.3
Bicycle.....	2	1	1	0.4	0.5	0.3
Motorcycle.....	3	-	3	0.6	-	0.7
All other means.....	1	-	1	0.2	-	0.2
Works at home.....	7	1	5	1.2	0.9	1.3

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the Miami SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thou- sands)	Percent by means of transportation						
		Total	Auto or truck		Public trans- porta- tion	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	543	100.0	66.4	20.7	7.0	3.5	1.1	1.2
SEX								
Male.....	314	100.0	72.6	17.1	4.2	3.1	1.7	1.2
Female.....	228	100.0	57.9	25.6	10.9	3.9	0.4	1.2
RACE								
White and other	460	100.0	68.4	21.0	4.7	3.4	1.1	1.4
Black.....	83	100.0	55.4	19.1	20.3	3.9	1.1	0.1
HOUSEHOLD RELATIONSHIP								
Head.....	332	100.0	73.1	15.4	6.1	3.0	1.2	1.2
Male.....	266	100.0	75.6	15.5	3.7	2.6	1.3	1.3
Female.....	66	100.0	62.8	15.0	15.5	4.7	0.6	1.1
Wife of head.....	119	100.0	57.1	31.1	7.1	3.6	0.1	1.0
Other member.....	92	100.0	54.8	26.2	10.6	4.9	2.3	1.4
EARNINGS								
Without earnings or not reported.....	60	100.0	60.7	21.1	7.0	4.8	1.3	5.3
With earnings.....	482	100.0	67.2	20.6	7.0	3.3	1.1	0.7
\$1 to 5,999.....	180	100.0	52.2	27.2	12.8	5.4	1.3	1.1
\$6,000 to 9,999.....	122	100.0	68.2	21.1	6.1	3.8	0.3	0.6
\$10,000 to 14,999.....	103	100.0	80.0	15.1	1.9	1.5	1.4	0.4
\$15,000 to 24,999.....	62	100.0	82.4	12.7	2.4	0.5	1.5	0.5
\$25,000 or more	16	100.0	87.0	10.5	0.6	-	1.9	-
Median earnings.....	\$7,788	...	\$9,233	\$6,116	\$4,704	\$4,766	\$7,862	\$4,780
Mean earnings.....	\$9,317	...	\$10,475	\$7,766	\$5,221	\$5,039	\$9,277	\$5,516

Table 4. Principal Means of Transportation, by Distance to Work, for the Miami SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	486	100.0	7.5	10.5	14.7	28.3	20.3	15.2	3.3	0.2	7.5	8.5
Drives alone.....	322	100.0	4.1	11.5	14.4	30.2	21.0	15.6	3.1	0.1	7.8	8.6
Carpool.....	106	100.0	4.8	8.8	15.9	26.9	22.8	15.2	4.9	0.6	8.3	9.5
Public transportation.....	35	100.0	2.0	7.1	20.4	30.9	18.1	19.0	2.5	-	7.8	8.6
Walks only.....	18	100.0	91.8	7.7	-	1.1	-	-	-	-	-	0.1
Other means.....	5	100.0	18.9	18.9	20.8	13.2	9.4	17.0	-	-	3.5	6.2

¹Excludes workers with no fixed place of work and workers who worked at home.**Table 5. Principal Means of Transportation, by Travel Time to Work, for the Miami SMSA**

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	486	100.0	13.7	13.4	34.6	6.3	17.0	9.8	0.9	4.2	21.1	22.3
Drives alone.....	322	100.0	13.0	14.5	38.2	6.7	16.7	8.9	0.6	1.5	20.4	20.4
Carpool.....	106	100.0	11.3	11.3	34.3	6.1	19.1	13.0	1.0	4.0	22.5	23.3
Public transportation.....	35	100.0	2.3	4.8	15.0	5.9	22.7	13.3	4.0	32.3	34.4	43.8
Walks only.....	18	100.0	58.8	21.4	13.2	0.5	3.3	1.6	-	1.1	8.2	9.6
Other means.....	5	100.0	26.4	17.0	24.5	5.7	9.4	11.3	1.9	-	16.5	17.9

¹Excludes workers with no fixed place of work and workers who worked at home.

Appendix A—Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 4,537 housing units were eligible for interview in AHS. Of these sample units, 216 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 473 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 8,248 persons 14 years and older. Of these, 21 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{Weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA, a noninterview factor was computed separately for 56 noninterview cells.

A ratio estimation procedure was then employed for all sample housing units from the permit-issuing universe. This factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement, the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, a person ratio estimate factor was calculated for each sector.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 17,100 conventional new construction units and 5,300 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and

nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 and A-2 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These

estimates of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 228,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 5,000. Consequently, the 68-percent confidence interval, as shown by these data, is from 223,000 to 233,000. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 220,000 to 236,000 workers with 90-percent confidence and within the interval from 218,000 to 238,000 with 95-percent confidence.

Table 3 also shows that of the 228,000 female workers, 10.9 percent commuted by means of public transportation. Interpolation in table A-2 of the appendix shows that the standard error of this percent is approximately 0.8 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 10.1 to 11.7 percent; the 90-percent confidence interval is from 9.6 to 12.2 percent; and the 95-percent confidence interval is from 9.3 to 12.5 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 4.2 percent of the male workers in this SMSA commuted by means of public transportation. Thus, the apparent difference, as shown by these data, between male and female public transportation use is 6.7 percent. Table A-2 of the appendix shows the standard error of 4.2 percent on a base of 314,000 is approximately 0.4, while the standard error of 10.9 percent is approximately 0.8 percent. Therefore, the standard error of the estimated difference of 6.7 percent is about

$$0.9 = \sqrt{(0.4)^2 + (0.8)^2}$$

Consequently, the 68-percent confidence interval for the 6.7 percent difference is from 5.8 to 7.6 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 5.3 to 8.1 percent, and the 95-percent confidence interval is from 4.9 to 8.5 percent. Thus, we can conclude with 95-percent confidence that the percentage of female workers who used public transportation in 1975 is greater than the percentage of male workers who used transit, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

1. Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.
2. Add to and subtract from 50 percent the standard error determined in step 1.
3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 20.4 minutes.

1. Using table A-2 of the appendix, the standard error of 50 percent on a base of 322,000 is found to be about 1.1 percent.
2. A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 47.8 and 52.2.
3. The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 27.5 percent of the persons fall in the intervals below the median interval, while 38.2 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{47.8 - 27.5}{38.2} \right) = 19.8$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{52.2 - 27.5}{38.2} \right) = 20.8$$

Thus, the 95-percent confidence interval on the estimated median is from 19.8 to 20.8 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} S^2}$$

where y is the size of the base, and b is a parameter which equals 139.3 for this SMSA, 130.0 for the central city, and 144.0 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for

group i ; and $\bar{X}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{X}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 20.4 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min.	.130	4.5
10 to 14 min.	.145	12.0
15 to 24 min.	.382	19.5
25 to 29 min.	.067	27.0
30 to 34 min.	.167	32.0
35 to 49 min.	.089	42.0
50 to 59 min.	.006	54.5
60 min. or more	.015	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 185.8$$

The b parameter is equal to 139.3. Thus the standard error on 20.4 minutes, $\sigma_{\bar{x}}$, is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{139.3}{322,000} (185.8)} = 0.3 \text{ minutes}$$

Consequently, the 68-percent confidence interval is estimated to be from 20.1 to 20.7 minutes, the 90-percent confidence interval is from 19.9 to 20.9 minutes, and the 95-percent confidence interval is from 19.8 to 21.0 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the Miami, Fla. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

(68 chances out of 100. For explanation of symbols, see text)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	140	130	140	25,000.....	1,850	1,730	1,870
100.....	140	130	140	50,000.....	2,580	2,330	2,600
200.....	170	160	170	75,000.....	3,120	2,700	3,140
500.....	260	250	270	100,000.....	3,560	2,940	3,560
700.....	310	300	320	150,000.....	4,260	3,110	4,210
1,000.....	370	360	380	250,000.....	5,210	2,280	5,020
2,500.....	590	570	600	500,000.....	6,240	-	5,370
5,000.....	830	800	850	800,000.....	5,720	-	2,180
10,000.....	1,170	1,120	1,190	1,000,000.....	4,030	-	-

Table A-2. Standard Errors for Estimated Percentage of Workers in the Miami, Fla. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	58.2	58.2	58.2	58.2	58.2	59.0
200.....	41.1	41.1	41.1	41.1	41.1	41.7
500.....	21.8	21.8	21.8	21.8	22.9	26.4
700.....	16.6	16.6	16.6	16.6	19.3	22.3
1,000.....	12.2	12.2	12.2	12.2	16.2	18.7
2,500.....	5.3	5.3	5.3	7.1	10.2	11.8
5,000.....	2.7	2.7	3.6	5.0	7.2	8.3
10,000.....	1.4	1.4	2.6	3.5	5.1	5.9
25,000.....	0.6	0.7	1.6	2.2	3.2	3.7
50,000.....	0.3	0.5	1.2	1.6	2.3	2.6
75,000.....	0.2	0.4	0.9	1.3	1.9	2.2
100,000.....	0.14	0.4	0.8	1.1	1.6	1.9
150,000.....	0.09	0.3	0.7	0.9	1.3	1.5
250,000.....	0.06	0.2	0.5	0.7	1.0	1.2
500,000.....	0.03	0.2	0.4	0.5	0.7	0.8
800,000.....	0.02	0.13	0.3	0.4	0.6	0.7
1,000,000.....	0.01	0.12	0.3	0.4	0.5	0.6

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person	(240)	Line number of respondent	(241)	If last worker in this household, mark this box []
7a. What is ...'s principal means of transportation to work?				8d. Was ...'s place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c(4))?
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <div style="margin-bottom: 10px;"> (242) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } → </div> <div> (243) 1 <input type="checkbox"/> Drives alone – Skip to 8a 2 <input type="checkbox"/> Shares driving } 3 <input type="checkbox"/> Drives others } Skip to 7c 4 <input type="checkbox"/> Rides with someone else } 5 <input type="checkbox"/> Walks only – Skip to 8a 6 <input type="checkbox"/> Works at home – Skip to 12a 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means – Specify _____ </div> </div> </div>				(248) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Don't know
b. Does ... usually ALSO use a car for part of the trip to work?				9. What time does ... usually leave for work?
(244) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No – Skip to 8a				(249) _____ Time (250) 1 <input type="checkbox"/> a.m. 2 <input type="checkbox"/> p.m.
c. How many people, including ..., usually ride in the car to work?				10. How long does it usually take ... to get from home to work?
(245) _____ Number				(251) _____ Minutes
8a. Does ... usually WORK at the same location each day?				11. What is ...'s ONE-WAY distance from home to work?
(246) 1 <input type="checkbox"/> Yes – Skip to 8c 2 <input type="checkbox"/> No				(252) _____ Miles OR 0 <input type="checkbox"/> Less than 1 mile
b. Does ... usually REPORT to the same location to begin work each day?				12a. In the last year, has ... changed his principal means of transportation to work?
(247) 3 <input type="checkbox"/> Yes 4 <input type="checkbox"/> No – Skip to 12a				(253) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No – Skip to 13
c. Where is ...'s usual place of work? (1) Company or business establishment name <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> (2) Address (Number and street) Note – If address (number and street name) are not known, enter building name, shopping center name, or other physical location description. <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> (3) Names of nearest intersecting streets <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> (4) Name of city, town, village, borough, etc. <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border-bottom: 1px solid black; height: 1.2em; width: 60%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 10%; text-align: center;">Place type →</div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 30%;"></div> </div> (5) County <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border-bottom: 1px solid black; height: 1.2em; width: 20%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 20%; text-align: center;">State</div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 20%; text-align: center;">ZIP code</div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 40%;"></div> </div>				b. What was ...'s principal means of transportation to work (prior to the change)?
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <div style="margin-bottom: 10px;"> (254) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } → </div> <div> (255) 1 <input type="checkbox"/> Drove alone 2 <input type="checkbox"/> Shared driving 3 <input type="checkbox"/> Drove others 4 <input type="checkbox"/> Rode with someone else 5 <input type="checkbox"/> Walked only 6 <input type="checkbox"/> Worked at home 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means – Specify _____ </div> </div> </div>				13. If "Yes" marked in 12a – ASK Compared to ...'s previous means of transportation to work (Given in 12b), how satisfied is ... with his present means of transportation to work – much more, more, about the same, less or much less satisfied?
(256) 1 <input type="checkbox"/> Much more satisfied 2 <input type="checkbox"/> More satisfied 3 <input type="checkbox"/> About the same satisfaction 4 <input type="checkbox"/> Less satisfied 5 <input type="checkbox"/> Much less satisfied 6 <input type="checkbox"/> Don't know 7 <input type="checkbox"/> Did not work last year				If "No" marked in 12a – ASK Compared to a year ago, how satisfied is ... now with his principal means of transportation to work – much more, more, about the same, less or much less satisfied?
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 45%; text-align: center;"> INTERVIEWER </div> <div style="width: 50%; font-size: small;"> Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a–e on page 19 of AHS-52 questionnaire. </div> </div>				

Appendix C—Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker *usually* carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

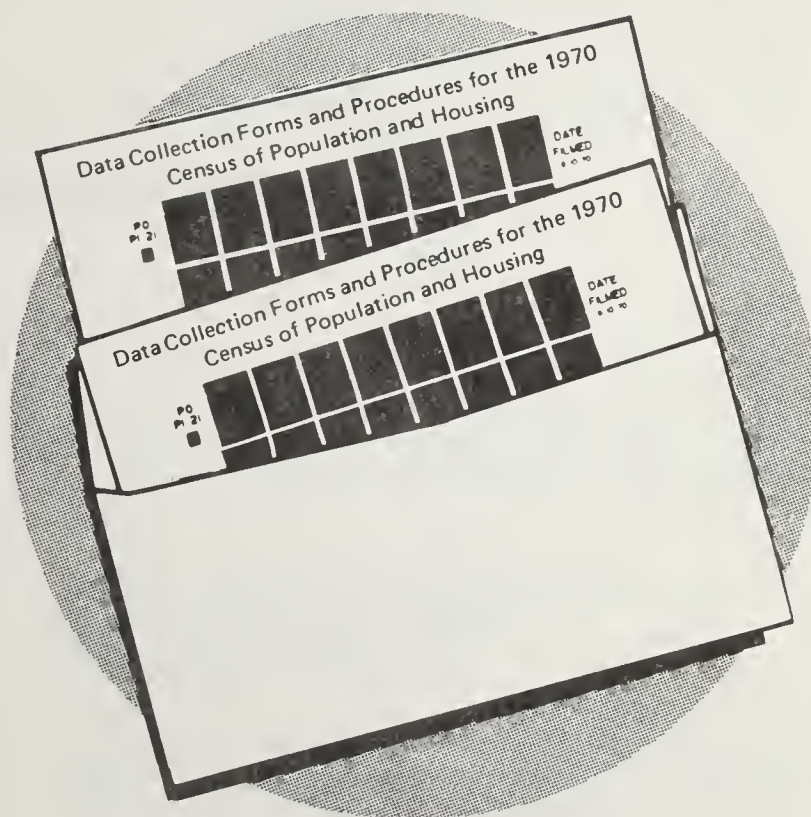
Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "-" means "rounds to or represents zero." Three dots "..." means "not applicable."

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1970 CENSUS OF POPULATION AND HOUSING

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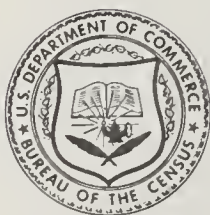
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U.S. Department of Commerce
BUREAU OF THE CENSUS

Series P-23, No. 94
Issued September 1979

Special Studies

Selected Characteristics of Travel to Work in the Cincinnati SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the Cincinnati SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the Cincinnati SMSA in 1975, about 219,000 workers, was comprised of persons who both lived and worked in the suburbs (table 1). In contrast, about 113,000 of the workers who lived in the suburbs worked in Cincinnati city. Among residents of the city, about 102,000 persons lived and worked in Cincinnati, while about 37,000 of the workers who lived in Cincinnati made the reverse trip from the city to suburban employment. Five percent of the suburban workers commuted to worksites outside the Cincinnati SMSA, while the figure for workers who lived in the city was about 1 percent.

MEANS OF TRANSPORTATION TO WORK

Of the approximately 541,000 workers living in the Cincinnati SMSA in 1975, the survey results show that the majority (68 percent) usually drove to work alone (table 2). The proportion who carpooled to work (20 percent) was much larger than the proportion who used public transportation (about 6 percent), while 4 percent walked, 2 percent worked at home, and 1 percent used other means. Workers

who lived in the suburbs were more likely to drive alone to work (71 percent) than residents of the city (60 percent), while workers who lived in Cincinnati were more likely to use public transportation (8 percent) than suburban residents (4 percent).

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were more likely than men to carpool or use public transportation (table 3).

Race. Black workers showed a lower incidence of driving alone (57 percent) than White¹ workers (about 69 percent), and a correspondingly higher incidence of using public transportation (17 percent compared with 5 percent). The proportions of Black workers and White workers who traveled in carpools, however, were not significantly different (table 3).

Household relationship. Female household heads were much less likely to drive alone to work and much more likely to use public transportation than male household heads in 1975 (table 3). Comparing working wives with female household heads, the data indicate that the wives were more likely to drive alone or carpool, and less likely to use public transit than female heads of households. Nineteen percent of the female heads used public transportation compared with 6 percent of the working wives.

Earnings. Comparing the three most widely used means of transportation, workers who drove alone to work had the highest median earnings (\$10,053), followed by workers in carpools (\$8,072) and users of public transit (\$5,618).

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was about 9 miles in 1975 (table 4). Workers who drove alone traveled about the average distance to get to work, while workers who carpooled traveled slightly farther (about 11 miles). Public transportation users, however, traveled about 7 miles on the average to get to work.

Travel time by means of transportation. The average commuting trip in the SMSA took about 21 minutes in 1975 (table 5). Workers who drove alone spent an average of 20 minutes getting to work, while the figure for those who carpooled was about 24 minutes. Public transportation users, on the other hand, spent an average of about 33 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 4,721 sample households in the Cincinnati SMSA were eligible to answer the inquiries contained in the Travel-to-Work Supplement.

The interviews resulted in responses from 9,434 workers 14 years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)	SURVEY GROUP II (1975 to 1976)	SURVEY GROUP III (1976 to 1977)
Albany-Schenectady-Troy, N.Y.	Atlanta, Ga.*	Allentown-Bethlehem-Easton, Pa.-N.J.
Anaheim-Santa Ana-Garden Grove, Calif.	Chicago, Ill.*	Baltimore, Md.
Boston, Mass.*	Cincinnati, Ohio-Ky.-Ind.	Birmingham, Ala.
Dallas, Tex.	Colorado Springs, Colo.	Buffalo, N.Y.
Detroit, Mich.*	Columbus, Ohio	Cleveland, Ohio
Fort Worth, Tex.	Hartford, Conn.	Denver, Colo.
Los Angeles-Long Beach, Calif.*	Kansas City, Mo.-Kans.	Grand Rapids, Mich.
Madison, Wis.†	Miami, Fla.	Honolulu, Hawaii
Memphis, Tenn.-Ark.	Milwaukee, Wis.	Houston, Tex.*
Minneapolis-St. Paul, Minn.	New Orleans, La.	Indianapolis, Ind.
Newark, N.J.	Newport News-Hampton, Va.	Las Vegas, Nev.
Orlando, Fla.	Paterson-Clifton-Passaic, N.J.	Louisville, Ky.-Ind.
Phoenix, Ariz.	Philadelphia, Pa.-N.J.*	New York, N.Y.*
Pittsburgh, Pa.	Portland, Oreg.-Wash.	Oklahoma City, Okla.
Saginaw, Mich.	Rochester, N.Y.	Omaha, Nebr.-Iowa
Salt Lake City, Utah	San Antonio, Tex.	Providence-Pawtucket-Warwick, R.I.
Spokane, Wash.	San Bernardino-Riverside-Ontario, Calif.	Mass.
Tacoma, Wash.	San Diego, Calif.	Raleigh, N.C.
Washington, D.C.-Md.-Va.*	San Francisco-Oakland, Calif.*	Sacramento, Calif.
Wichita, Kans.	Springfield-Chicopee-Holyoke, Mass.-Conn.	St. Louis, Mo.-Ill.*
		Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

CURRENT POPULATION REPORTS

Special Studies



U.S. Department of Commerce
BUREAU OF THE CENSUS

Series P-23, No. 94
Issued September 1979

Selected Characteristics of Travel to Work in the Cincinnati SMSA: 1975

Errata Sheet

The data for "Inside central city (cities)" as shown in table 2 on page 4 of the published report are incorrect. The corrected table follows.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the Cincinnati SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	541	156	385	100.0	100.0	100.0
Auto or truck.....	474	123	351	87.7	79.0	91.2
Drives alone.....	366	93	273	67.8	59.7	71.0
Carpool.....	108	30	78	19.9	19.3	20.1
Public transportation.....	35	21	14	6.4	13.3	3.7
Walks only.....	20	9	11	3.6	5.7	2.8
Other means.....	3	1	2	0.6	0.5	0.6
Bicycle.....	1	-	1	0.1	-	0.2
Motorcycle.....	2	-	1	0.3	-	0.4
All other means.....	1	-	-	0.1	-	-
Works at home.....	9	2	7	1.7	1.5	1.8

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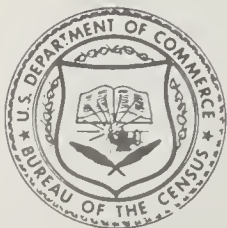
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SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group III are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the Cincinnati SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside the SMSA			Outside the SMSA		
			Total	Cincinnati city	Outside central city			
SMSA.....	541	491	472	216	256	20	46	3
Cincinnati city.....	156	141	139	102	37	1	15	1
Outside central city.....	385	351	332	113	219	19	32	2
PERCENT DISTRIBUTION								
SMSA.....	[100.0]	100.0	96.0	43.9	52.1	4.0	[8.5]	[0.5]
Cincinnati city.....	[100.0]	100.0	99.1	72.9	26.2	0.9	[9.3]	[0.5]
Outside central city.....	[100.0]	100.0	94.7	32.2	62.5	5.3	[8.2]	[0.5]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the Cincinnati SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	541	103	385	100.0	100.0	100.0
Auto or truck.....	474	88	351	87.7	85.1	91.2
Drives alone.....	366	62	273	67.8	59.9	71.0
Carpool.....	108	26	78	19.9	25.1	20.1
Public transportation.....	35	9	14	6.4	8.3	3.7
Walks only.....	20	5	11	3.6	4.5	2.8
Other means.....	3	1	2	0.6	0.5	0.6
Bicycle.....	1	-	1	0.1	-	0.2
Motorcycle.....	2	-	1	0.3	-	0.4
All other means.....	1	-	-	0.1	-	-
Works at home.....	9	2	7	1.7	1.6	1.8

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the Cincinnati SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thou- sands)	Percent by means of transportation						
		Total	Auto or truck		Public trans- porta- tion	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	541	100.0	67.8	19.9	6.4	3.6	0.6	1.7
SEX								
Male.....	329	100.0	74.4	16.7	3.7	3.1	0.8	1.2
Female.....	212	100.0	57.6	24.8	10.8	4.3	0.2	2.4
RACE								
White and other	491	100.0	68.9	19.9	5.4	3.6	0.6	1.7
Black.....	50	100.0	57.0	20.4	16.8	3.8	0.2	1.6
HOUSEHOLD RELATIONSHIP								
Head.....	332	100.0	72.2	17.1	5.7	2.9	0.6	1.5
Male.....	277	100.0	75.7	16.9	3.0	2.2	0.7	1.4
Female.....	55	100.0	54.4	17.9	19.4	5.9	0.2	2.0
Wife of head.....	112	100.0	61.3	26.3	5.9	3.1	0.2	3.1
Other member.....	97	100.0	59.9	21.9	9.7	6.8	1.0	0.6
EARNINGS								
Without earnings or not reported.....	50	100.0	63.3	14.8	7.4	3.6	1.0	9.8
With earnings.....	490	100.0	68.2	20.4	6.3	3.6	0.6	0.8
\$1 to 5,999.....	157	100.0	56.9	22.4	10.6	7.8	0.6	1.7
\$6,000 to 9,999.....	119	100.0	64.7	24.5	7.0	2.6	0.3	0.8
\$10,000 to 14,999.....	122	100.0	77.0	17.8	3.0	1.6	0.5	0.1
\$15,000 to 24,999.....	75	100.0	78.7	16.7	2.9	0.7	0.5	0.3
\$25,000 or more	17	100.0	87.9	9.2	0.6	-	0.6	1.1
Median earnings.....	\$8,971	...	\$10,053	\$8,072	\$5,618	\$3,636	\$8,334	\$3,497
Mean earnings.....	\$9,670	...	\$10,581	\$8,716	\$6,397	\$4,646	\$8,484	\$6,014

Table 4. Principal Means of Transportation, by Distance to Work, for the Cincinnati SMSA

Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Mode of transportation	Total ¹ (thousands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	485	100.0	7.5	12.0	13.1	27.1	17.8	16.5	5.5	0.4	7.7	9.3
Walk alone.....	331	100.0	4.8	12.6	13.0	28.3	18.9	17.0	5.1	0.4	8.0	9.4
Public transportation.....	101	100.0	2.9	9.8	13.4	25.4	18.3	20.2	9.3	0.8	9.2	11.2
Car transportation.....	33	100.0	2.8	13.8	20.8	36.4	16.5	8.9	0.9	-	6.3	7.1
Car only.....	18	100.0	89.6	9.9	-	0.5	-	-	-	-	0.1	0.1
Other means.....	3	100.0	28.6	21.4	7.1	10.7	7.1	17.9	3.6	-	2.6	7.0

Excludes workers with no fixed place of work and workers who worked at home.

Table 5. Principal Means of Transportation, by Travel Time to Work, for the Cincinnati SMSA

Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Mode of transportation	Total ¹ (thousands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	485	100.0	14.7	14.1	35.4	7.8	14.2	10.2	0.8	2.7	20.5	21.1
Walk alone.....	331	100.0	15.3	14.8	37.5	8.4	13.4	8.2	0.6	1.7	19.8	19.8
Public transportation.....	101	100.0	9.8	11.8	34.7	7.6	17.3	14.8	1.2	2.9	22.7	23.5
Car transportation.....	33	100.0	4.0	6.1	26.6	7.0	18.7	22.9	1.5	14.1	31.3	33.0
Car only.....	18	100.0	48.9	25.8	21.4	1.1	1.6	-	-	0.5	9.7	9.5
Other means.....	3	100.0	32.1	21.4	21.4	-	10.7	7.1	3.6	3.6	14.4	18.7

Excludes workers with no fixed place of work and workers who worked at home.

Appendix A — Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 4,721 housing units were eligible for interview in AHS. Of these sample units, 173 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 408 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 9,491 persons 14 years and older. Of these, 57 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is not 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory

estimation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{Weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA, a noninterview factor was computed separately for 56 noninterview cells.

A ratio estimation procedure was then employed for all sample housing units from the permit-issuing universe. This factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement, the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, a person ratio estimate factor was calculated for each sector.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 2,300 conventional new construction units and 1,700 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and

nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 and A-2 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These

estimates of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 212,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 4,410. Consequently, the 68-percent confidence interval, as shown by these data, is from 207,590 to 216,410. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 204,940 to 219,060 workers with 90-percent confidence and within the interval from 203,180 to 220,820 with 95-percent confidence.

Table 3 also shows that of the 212,000 female workers, 10.8 percent commuted by means of public transportation. Interpolation in table A-2 of the appendix shows that the standard error of this percent is approximately 0.8 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 10.0 to 11.6 percent; the 90-percent confidence interval is from 9.5 to 12.1 percent; and the 95-percent confidence interval is from 9.2 to 12.4 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 3.7 percent of the male workers in this SMSA commuted by means of public transportation. Thus, the apparent difference, as shown by these data, between male and female public transportation use is 7.1 percent. Table A-2 of the appendix shows the standard error of 3.7 percent on a base of 329,000 is approximately 0.3 percent, while the standard error of 10.8 percent is approximately 0.8 percent. Therefore, the standard error of the estimated difference of 7.1 percent is about

$$0.9 = \sqrt{(0.3)^2 + (0.8)^2}$$

Consequently, the 68-percent confidence interval for the 7.1 percent difference is from 6.2 to 8.0 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 5.7 to 8.5 percent, and the 95-percent confidence interval is from 5.3 to 8.9 percent. Thus, we can conclude with 95-percent confidence that the percentage of female workers who used public transportation in 1975 is greater than the percentage of male workers who used transit, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

1. Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.
2. Add to and subtract from 50 percent the standard error determined in step 1.
3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 19.8 minutes.

1. Using table A-2 of the appendix, the standard error of 50 percent on a base of 331,000 is found to be about 1.0 percent.
2. A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 48.0 and 52.0.
3. The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 30.1 percent of the persons fall in the intervals below the median interval, while 37.5 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{48.0 - 30.1}{37.5} \right) = 19.3$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{52.0 - 30.1}{37.5} \right) = 20.3$$

Thus, the 95-percent confidence interval on the estimated median is from 19.3 to 20.3 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y}} S^2$$

where y is the size of the base, and b is a parameter which equals 117.9 for this SMSA, 113.1 for the central city, and 113.6 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for

group i ; and $\bar{X}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{X}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 19.8 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min.	.153	4.5
10 to 14 min.	.148	12.0
15 to 24 min.	.375	19.5
25 to 29 min.	.084	27.0
30 to 34 min.	.134	32.0
35 to 49 min.	.082	42.0
50 to 59 min.	.006	54.5
60 min. or more	.017	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 197.6$$

The b parameter is equal to 117.9. Thus the standard error on 19.8 minutes, $\sigma_{\bar{x}}$, is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{117.9}{331,000}} (197.6) = 0.3 \text{ minutes}$$

Consequently, the 68-percent confidence interval is estimated to be from 19.5 to 20.1 minutes, the 90-percent confidence interval is from 19.3 to 20.3 minutes, and the 95-percent confidence interval is from 19.2 to 20.4 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the Cincinnati, Ohio-Ky.-Ind. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

(68 chances out of 100. For explanation of symbols, see text)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	120	110	110	50,000.....	2,370	2,180	2,300
100.....	120	110	110	75,000.....	2,860	2,540	2,760
200.....	150	150	150	100,000.....	3,260	2,780	3,130
500.....	240	240	240	150,000.....	3,890	2,980	3,670
700.....	290	280	280	250,000.....	4,730	2,410	4,300
1,000.....	340	340	340	300,000.....	5,010	1,260	4,450
2,500.....	540	530	530	500,000.....	5,510	-	4,140
5,000.....	770	750	750	700,000.....	5,150	-	1,350
10,000.....	1,080	1,050	1,060	1,000,000.....	1,890	-	-
25,000.....	1,700	1,610	1,660				

Table A-2. Standard Errors for Estimated Percentages of Workers in the Cincinnati, Ohio-Ky.-Ind. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	54.1	54.1	54.1	54.1	54.1	54.3
200.....	37.1	37.1	37.1	37.1	37.1	38.4
500.....	19.1	19.1	19.1	19.1	21.0	24.3
700.....	14.4	14.4	14.4	14.4	17.8	20.5
1,000.....	10.5	10.5	10.5	10.5	14.9	17.2
2,500.....	4.5	4.5	4.7	6.5	9.4	10.9
5,000.....	2.3	2.3	3.3	4.6	6.6	7.7
10,000.....	1.2	1.2	2.4	3.3	4.7	5.4
25,000.....	0.5	0.7	1.5	2.1	3.0	3.4
50,000.....	0.2	0.5	1.1	1.5	2.1	2.4
75,000.....	0.2	0.4	0.9	1.2	1.7	2.0
100,000.....	0.12	0.3	0.7	1.0	1.5	1.7
150,000.....	0.08	0.3	0.6	0.8	1.2	1.4
250,000.....	0.05	0.2	0.5	0.7	0.9	1.1
300,000.....	0.04	0.2	0.4	0.6	0.9	1.0
500,000.....	0.02	0.15	0.3	0.5	0.7	0.8
700,000.....	0.02	0.13	0.3	0.4	0.6	0.6
1,000,000.....	0.01	0.11	0.2	0.3	0.5	0.5

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person	(240)	Line number of respondent	(241)	If last worker in this household, mark this box <input type="checkbox"/>
7a. What is ...'s principal means of transportation to work? <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>(242) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } →</p> <p>(243) 1 <input type="checkbox"/> Drives alone — Skip to 8a 2 <input type="checkbox"/> Shares driving } 3 <input type="checkbox"/> Drives others } Skip to 7c 4 <input type="checkbox"/> Rides with someone else }</p> <p>5 <input type="checkbox"/> Walks only — Skip to 8a 6 <input type="checkbox"/> Works at home — Skip to 12a 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means — Specify _____</p> </div> <div style="width: 5%; text-align: center;"> <p>7a</p> </div> </div>				8d. Was ...'s place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c(4))? (248) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Don't know
b. Does ... usually ALSO use a car for part of the trip to work? (244) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No — Skip to 8a				9. What time does ... usually leave for work? (249) _____ Time (250) 1 <input type="checkbox"/> a.m. 2 <input type="checkbox"/> p.m.
c. How many people, including ..., usually ride in the car to work? (245) _____ Number				10. How long does it usually take ... to get from home to work? (251) _____ Minutes
8a. Does ... usually WORK at the same location each day? (246) 1 <input type="checkbox"/> Yes — Skip to 8c 2 <input type="checkbox"/> No				11. What is ...'s ONE-WAY distance from home to work? (252) _____ Miles OR 0 <input type="checkbox"/> Less than 1 mile
b. Does ... usually REPORT to the same location to begin work each day? (247) 3 <input type="checkbox"/> Yes 4 <input type="checkbox"/> No — Skip to 12a				12a. In the last year, has ... changed his principal means of transportation to work? (253) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No — Skip to 13
c. Where is ...'s usual place of work? (1) Company or business establishment name <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div>				b. What was ...'s principal means of transportation to work (prior to the change)? (254) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } → (255) 1 <input type="checkbox"/> Drove alone 2 <input type="checkbox"/> Shared driving 3 <input type="checkbox"/> Drove others 4 <input type="checkbox"/> Rode with someone else 5 <input type="checkbox"/> Walked only 6 <input type="checkbox"/> Worked at home 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means — Specify _____
(2) Address (Number and street) Note — If address (number and street name) are not known, enter building name, shopping center name, or other physical location description. <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div>				13. If "Yes" marked in 12a — ASK Compared to ...'s previous means of transportation to work (Given in 12b), how satisfied is ... with his present means of transportation to work — much more, more, about the same, less or much less satisfied? (256) 1 <input type="checkbox"/> Much more satisfied 2 <input type="checkbox"/> More satisfied 3 <input type="checkbox"/> About the same satisfaction 4 <input type="checkbox"/> Less satisfied 5 <input type="checkbox"/> Much less satisfied 6 <input type="checkbox"/> Don't know 7 <input type="checkbox"/> Did not work last year
(3) Names of nearest intersecting streets <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div>				If "No" marked in 12a — ASK Compared to a year ago, how satisfied is ... now with his principal means of transportation to work — much more, more, about the same, less or much less satisfied? <div style="text-align: center;">←</div>
(4) Name of city, town, village, borough, etc. <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div>				
<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> (5) County <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> </div> <div style="width: 20%; text-align: center;"> Place type → <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> </div> <div style="width: 60%;"></div> </div>				
<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> State ZIP code <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> </div> <div style="width: 80%;"></div> </div>				
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 40%; border: 1px solid black; padding: 5px;">INTERVIEWER</div> <div style="width: 60%; text-align: right;"> Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a–e on page 19 of AHS-52 questionnaire. </div> </div>				

Appendix C—Definitions and Explanations

DEFINITIONS AND EXPLANATIONS

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker *usually* carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "-" means "rounds to or represents zero." Three dots "..." means "not applicable."

Current Population Reports

P-20 POPULATION CHARACTERISTICS.

Current national and, in some cases, regional data on geographic residence and mobility, fertility, education, school enrollment, marital status, numbers and characteristics of households and families, and persons of Spanish origin. Approximately 20 reports each year.

P-23 SPECIAL STUDIES.

Reports on methods, concepts or specialized data. Included in the series is an annual report on the Black population and periodic reports on the metropolitan-nonmetropolitan population, American youth, the older population, and other topics.

P-25 POPULATION ESTIMATES AND PROJECTIONS.

Monthly estimates of the total population of the United States; annual mid-year estimates of the population of States by broad age groups, and of the United States by age, race, and sex; annual estimates of the components of population change. Estimates of the population of selected metropolitan areas and their component counties. Projections of the future population of the United States and individual States. Approximately 70 reports each year.

P-26 FEDERAL-STATE COOPERATIVE PROGRAM FOR POPULATION ESTIMATES.

Population estimates for counties for

selected States in which the figures are prepared by a State agency as part of the Federal-State Cooperative Program for Local Population Estimates.

P-27 FARM POPULATION.

(Census-ERS). Data on the size and selected characteristics of the farm population of the United States. Issued jointly with the Economic Research Service, U.S. Department of Agriculture. One or two reports each year.

P-28 SPECIAL CENSUSES.

Results of population censuses taken at the request and expense of city or other local governments. Subscription includes only the biannual summaries showing the total population figures for all the censuses conducted during the particular period. Individual reports issued for areas of 50,000 or more, showing the population by age, sex, and race, are available separately. See "How to Order Reports."

P-60 CONSUMER INCOME.

Information on the proportions of families, individuals, and households at various income levels. Data are also presented on the relationship of income to age, sex, race, family size, education, occupation, work experience, and other characteristics. A

In addition to the findings of the Census of Population, conducted every 10 years, the Bureau of the Census publishes continuing and up-to-date statistics on population counts, characteristics, and other special studies on the American people. Data are issued in the seven separate series of reports described here and are released under the general title, Current Population Reports.

special annual report provides detailed information on low-income families and individuals. Five reports each year.

HOW TO ORDER REPORTS

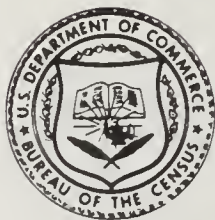
Current Population Reports are sold as two separate subscriptions. Series P-20, 23, 27, and 60 (Population Characteristics, Special Studies, Farm Population, and Consumer Income) cost \$40 a year (add \$10 for foreign mailing). Series P-25, 26, and 28 (Population Estimates and Projections, Federal-State Cooperative Program, and Special Censuses) cost \$70 a year (add \$17.50 for foreign mailing). (Series P-28 includes biannual summaries only).

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Series P-23, No. 95
Issued October 1979

Selected Characteristics of Travel to Work in the San Bernardino-Riverside-Ontario SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the San Bernardino-Riverside-Ontario SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the San Bernardino-Riverside-Ontario SMSA in 1975, about 186,000 workers, was comprised of persons who both lived and worked in the suburbs (table 1). In comparison, about 66,000 workers both lived and worked in the central cities. Approximately 51,000 suburban residents commuted into the central cities to work, while about 26,000 residents of the central cities made the reverse trip from the city to suburban employment. About 10 percent of the workers who lived in the central cities traveled outside the SMSA to work, while in the suburbs the figure was about 13 percent.

MEANS OF TRANSPORTATION TO WORK

Of the approximately 415,000 workers living in the San Bernardino-Riverside-Ontario SMSA in 1975, the survey results show that a large majority (76 percent) usually drove to work alone (table 2). The proportion who carpooled to work (16 percent) was much larger than the proportion who used public transportation (about 1 percent), while about 3 percent each walked, worked at home, and used other means of transportation to get to work.

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. The difference between male and female workers in the proportion who drove alone to work (76 percent compared with 75 percent) was not significant in this SMSA in 1975 (table 3). Similarly, the difference between men and women in the rate of carpools (15 percent compared with 17 percent) was not statistically significant.

Race. The results of the survey present some evidence that Black workers in the SMSA exhibited a lower incidence of driving alone to work than White¹ workers (68 percent compared with 76 percent), but the difference in carpools rates between Black and White workers (20 percent compared with 16 percent) was not significant.

Household relationship. The rate of driving alone to work was very similar among male heads of household (78 percent), female household heads (76 percent), and working wives (75 percent) in this metropolitan area (table 3). Wives of household heads exhibited the highest rate of carpools in the San Bernardino area in 1975 (about 18 percent), while the difference between male and female heads of household was not significant (14 percent compared with 12 percent). Walking to work was most prevalent among female heads (about 6 percent), while about 2 percent each of the male heads and wives walked to work.

Earnings. Persons who drove alone to work in the San Bernardino area had higher median earnings (\$9,098), than workers in carpools (\$8,159). The difference in median earnings between workers who carpooled and those who used other means (\$7,465), however, was not significant.

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was about 10 miles in 1975 (table 4). Mean distance to work for workers who drove alone was about the same as the SMSA average, while workers who carpooled traveled about 14 miles to get to work.

Travel time by means of transportation. The average commuting trip in the SMSA took about 17 minutes in 1975 (table 5). There is some evidence that workers who drove alone spent slightly less than the average amount of time getting to work, while the figure for those who carpooled was about 23 minutes. As expected, workers who walked to work spent the least amount of time, on the average, getting to their jobs, 9 minutes.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 4,963 sample households in the San Bernardino-Riverside-Ontario SMSA were eligible to answer the inquiries contained in the

Travel-to-Work Supplement. The interviews resulted in responses from 8,479 workers 14 years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)	SURVEY GROUP II (1975 to 1976)	SURVEY GROUP III (1976 to 1977)
Albany-Schenectady-Troy, N.Y.	Atlanta, Ga.*	Allentown-Bethlehem-Easton, Pa.-N.J.
Anaheim-Santa Ana-Garden Grove, Calif.	Chicago, Ill.*	Baltimore, Md.
Boston, Mass.*	Cincinnati, Ohio-Ky.-Ind.	Birmingham, Ala.
Dallas, Tex.	Colorado Springs, Colo.	Buffalo, N.Y.
Detroit, Mich.*	Columbus, Ohio	Cleveland, Ohio
Fort Worth, Tex.	Hartford, Conn.	Denver, Colo.
Los Angeles-Long Beach, Calif.*	Kansas City, Mo.-Kans.	Grand Rapids, Mich.
Madison, Wis.†	Miami, Fla.	Honolulu, Hawaii
Memphis, Tenn.-Ark.	Milwaukee, Wis.	Houston, Tex.*
Minneapolis-St. Paul, Minn.	New Orleans, La.	Indianapolis, Ind.
Newark, N.J.	Newport News-Hampton, Va.	Las Vegas, Nev.
Orlando, Fla.	Paterson-Clifton-Passaic, N.J.	Louisville, Ky.-Ind.
Phoenix, Ariz.	Philadelphia, Pa.-N.J.*	New York, N.Y.*
Pittsburgh, Pa.	Portland, Oreg.-Wash.	Oklahoma City, Okla.
Saginaw, Mich.	Rochester, N.Y.	Omaha, Nebr.-Iowa
Salt Lake City, Utah	San Antonio, Tex.	Providence-Pawtucket-Warwick, R.I.-Mass.
Spokane, Wash.	San Bernardino-Riverside-Ontario, Calif.	Raleigh, N.C.
Tacoma, Wash.	San Diego, Calif.	Sacramento, Calif.
Washington, D.C.-Md.-Va.*	San Francisco-Oakland, Calif.*	St. Louis, Mo.-Ill.*
Wichita, Kans.	Springfield-Chicopee-Holyoke, Mass.-Conn.	Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group I are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the San Bernardino-Riverside-Ontario SMSA

Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside the SMSA			Outside the SMSA		
			Total	Inside central cities	Outside central cities			
SMSA.....	415	374	328	117	212	46	40	-
Inside central cities.....	111	102	91	66	26	10	9	-
Outside central cities.....	305	273	237	51	186	36	31	-
PERCENT DISTRIBUTION								
SMSA.....	[100.0]	100.0	87.7	31.2	56.5	12.3	[9.7]	-
Inside central cities.....	[100.0]	100.0	90.0	64.8	25.2	10.0	[8.0]	-
Outside central cities.....	[100.0]	100.0	86.8	18.6	68.2	13.2	[10.3]	-

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the San Bernardino-Riverside-Ontario SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	415	111	305	100.0	100.0	100.0
Auto or truck.....	379	102	278	91.4	92.0	91.2
Drives alone.....	313	86	228	75.5	77.5	74.7
Carpool.....	66	16	50	15.9	14.5	16.5
Public transportation.....	2	1	1	0.5	0.9	0.4
Walks only.....	11	2	9	2.7	1.9	3.0
Other means.....	11	3	8	2.7	2.7	2.7
Bicycle.....	5	2	3	1.1	1.4	1.0
Motorcycle.....	5	1	4	1.2	0.7	1.4
All other means.....	2	1	1	0.4	0.5	0.3
Works at home.....	11	3	8	2.7	2.5	2.7

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the San Bernardino-Riverside-Ontario SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thousands)	Percent by means of transportation						
		Total	Auto or truck		Public transportation	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	415	100.0	75.5	15.9	0.5	2.7	2.7	2.7
SEX								
Male.....	264	100.0	75.9	15.4	0.2	2.5	3.8	2.2
Female.....	151	100.0	74.6	16.8	1.2	3.0	0.9	3.6
RACE								
White and other	402	100.0	75.7	15.8	0.5	2.7	2.6	2.8
Black.....	14	100.0	68.4	19.9	1.5	3.7	5.9	0.7
HOUSEHOLD RELATIONSHIP								
Head.....	260	100.0	77.8	14.1	0.4	2.7	2.7	2.3
Male.....	229	100.0	78.0	14.4	0.1	2.3	3.0	2.1
Female.....	31	100.0	76.4	11.8	2.9	6.1	0.3	2.9
Wife of head.....	96	100.0	75.4	17.7	0.7	2.1	0.5	3.6
Other member.....	60	100.0	65.4	21.0	0.7	3.5	6.2	3.2
EARNINGS								
Without earnings or not reported.....	54	100.0	67.1	16.1	0.4	3.0	1.3	12.1
With earnings.....	362	100.0	76.7	15.9	0.6	2.7	2.9	1.3
\$1 to 5,999.....	119	100.0	70.8	17.1	1.3	4.3	3.8	2.5
\$6,000 to 9,999.....	91	100.0	77.5	17.0	0.4	2.3	1.9	0.9
\$10,000 to 14,999.....	87	100.0	80.5	14.4	-	1.5	3.0	0.6
\$15,000 to 24,999.....	57	100.0	79.7	15.3	-	1.6	2.6	0.4
\$25,000 or more	8	100.0	90.5	7.1	-	2.4	-	-
Median earnings.....	\$8,714	...	\$9,098	\$8,159	\$4,133	\$5,380	\$7,465	\$4,242
Mean earnings.....	\$9,335	...	\$9,744	\$8,562	\$3,811	\$6,759	\$8,012	\$5,246

Table 4. Principal Means of Transportation, by Distance to Work, for
the San Bernardino-Riverside-Ontario SMSA

Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	364	100.0	10.1	18.0	15.1	23.1	12.1	11.0	7.6	2.9	6.0	10.0
Wives alone.....	279	100.0	7.7	18.0	15.9	25.0	12.9	11.2	6.8	2.5	6.2	9.7
Carpool.....	61	100.0	4.8	17.4	13.1	20.5	10.7	13.7	13.9	5.8	8.1	14.2
Public transportation	2	100.0	-	35.0	20.0	25.0	15.0	-	-	-	3.7	4.6
Walks only.....	11	100.0	89.1	10.9	-	-	-	-	-	-	0.1	0.1
Other means.....	11	100.0	25.7	25.7	17.4	13.8	9.2	3.7	2.8	0.9	2.3	5.1

¹Excludes workers with no fixed place of work and workers who worked at home.

Table 5. Principal Means of Transportation, by Travel Time to Work, for
the San Bernardino-Riverside-Ontario SMSA

Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	364	100.0	28.7	20.2	30.7	3.7	6.8	5.1	0.6	4.2	14.9	17.3
Wives alone.....	279	100.0	29.5	20.6	31.1	3.8	6.5	4.6	0.5	3.3	14.5	16.5
Carpool.....	61	100.0	20.2	19.2	28.6	4.1	9.4	7.8	1.3	9.4	18.2	22.8
Public transportation	2	100.0	5.0	10.0	35.0	10.0	10.0	20.0	5.0	-	24.0	25.1
Walks only.....	11	100.0	57.3	19.1	18.2	0.9	1.8	1.8	-	0.9	8.4	9.1
Other means.....	11	100.0	29.4	17.4	42.2	1.8	4.6	2.8	-	0.9	15.2	14.6

¹Excludes workers with no fixed place of work and workers who worked at home.

Appendix A—Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 4,963 housing units were eligible for interview in AHS. Of these sample units, 241 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or, for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 347 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 8,515 persons 14 years and older. Of these, 36 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{Weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA a noninterview factor was computed separately for 5 noninterview cells.

A ratio estimation procedure was then employed for a sample housing units from the permit-issuing universe. The factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement, the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, one person ratio estimate factor was calculated for the whole SMSA.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 3,100 conventional new construction units and 10,300 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and

nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 and A-2 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These estimates

of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 151,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 3,720. Consequently, the 68-percent confidence interval, as shown by these data, is from 147,280 to 154,720. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 145,050 to 156,950 workers with 90-percent confidence and within the interval from 143,560 to 158,440 with 95-percent confidence.

Table 3 also shows that of the 151,000 female workers, 16.8 percent commuted by means of carpools. Interpolation in table A-2 of the appendix shows that the standard error of this percent is approximately 1.0 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 15.8 to 17.8 percent; the 90-percent confidence interval is from 15.2 to 18.4 percent; and the 95-percent confidence interval is from 14.8 to 18.8 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate, considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 15.4 percent of the male workers in this SMSA commuted by means of carpools. Thus, the apparent difference, as shown by these data, between the percentage of carpool use by males and females is 1.4 percent. Table A-1 of the appendix shows the standard error of 15.4 percent on a base of 264,000 is approximately 0.8 percent, while the standard error of 16.8 percent is approximately 1.0 percent. Therefore, the standard error of the estimated difference of 1.4 percent is about

$$1.3 = \sqrt{(1.0)^2 + (0.8)^2}$$

Consequently, the 68-percent confidence interval for the 1.4 percent difference is from 0.1 to 2.7 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from -0.7 to 3.5 percent, and the 95-percent confidence interval is from -1.2 to 4.0 percent. Thus, we cannot conclude that the percentage of female workers who used carpools in 1975 is greater than the percentage of male workers who used carpools, since the 90- and 95-percent confidence intervals include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.

Add to and subtract from 50 percent the standard error determined in step 1.

Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 14.9 minutes.

Using table A-2 of the appendix, the standard error of 50 percent on a base of 279,000 is found to be about 1.0 percent.

A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 48.0 and 52.0.

The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 50.1 percent of the persons fall in the intervals below the median interval, while 31.1 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{48.0 - 50.1}{31.1} \right) = 13.8$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{52.0 - 50.1}{31.1} \right) = 15.1$$

Thus, the 95-percent confidence interval on the estimated median is from 13.8 to 15.1 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} S^2}$$

where y is the size of the base, and b is a parameter which equals 110.0 for this SMSA, 106.5 for the central city, and 114.5 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for group

i ; and $\bar{X}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{X}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 16.5 minutes. The values of P_i and \bar{X}_i for each group are shown below:

<u>Class Interval</u>	<u>P_i</u>	<u>\bar{X}_i</u>
Less than 10 min.	.295	4.5
10 to 14 min.	.206	12.0
15 to 24 min.	.311	19.5
25 to 29 min.	.038	27.0
30 to 34 min.	.065	32.0
35 to 49 min.	.046	42.0
50 to 59 min.	.005	54.5
60 min. or more	.033	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 282.2$$

The b parameter is equal to 110.0. Thus the standard error on 16.5 minutes, $\sigma_{\bar{x}}$, is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{110.0}{279,000} (282.2)} = 0.3 \text{ minutes}$$

Consequently, the 68-percent confidence interval is estimated to be from 16.2 to 16.8 minutes, the 90-percent confidence interval is from 16.0 to 17.0 minutes, and the 95-percent confidence interval is from 15.9 to 17.1 minutes

Table A-1. Standard Errors for Estimated Number of Workers in the San Bernardino-Riverside-Ontario, Calif. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

(68 chances out of 100. For meaning of symbols, see text)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	110	110	110	50,000.....	2,280	2,040	2,300
100.....	110	110	110	75,000.....	2,750	2,330	2,760
200.....	150	150	150	100,000.....	3,130	2,460	3,120
500.....	230	230	240	150,000.....	3,710	2,380	3,650
700.....	280	270	280	200,000.....	4,140	1,720	4,000
1,000.....	330	330	340	250,000.....	4,460	-	4,230
2,500.....	520	510	530	500,000.....	4,940	-	3,780
5,000.....	740	720	750	600,000.....	4,680	-	2,610
10,000.....	1,040	1,010	1,060	800,000.....	3,100	-	-
25,000.....	1,640	1,540	1,660				

Table A-2. Standard Errors for Estimated Percentage of Workers in the San Bernardino-Riverside-Ontario, Calif. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50 or 50
100.....	52.4	52.4	52.4	52.4	52.4	52.4
200.....	35.5	35.5	35.5	35.5	35.5	37.1
500.....	18.0	18.0	18.0	18.0	20.3	23.5
700.....	13.6	13.6	13.6	13.6	17.2	19.8
1,000.....	9.9	9.9	9.9	10.0	14.4	16.0
2,500.....	4.2	4.2	4.6	6.3	9.1	10.1
5,000.....	2.2	2.2	3.2	4.5	6.4	7.4
10,000.....	1.1	1.1	2.3	3.1	4.5	5.1
25,000.....	0.4	0.7	1.4	2.0	2.9	3.1
50,000.....	0.2	0.5	1.0	1.4	2.0	2.1
75,000.....	0.15	0.4	0.8	1.1	1.7	1.6
100,000.....	0.11	0.3	0.7	1.0	1.4	1.4
150,000.....	0.07	0.3	0.6	0.8	1.2	1.4
200,000.....	0.05	0.2	0.5	0.7	1.0	1.4
250,000.....	0.04	0.2	0.5	0.6	0.9	1.4
500,000.....	0.02	0.15	0.3	0.4	0.6	0.9
600,000.....	0.02	0.13	0.3	0.4	0.6	0.9
800,000.....	0.01	0.12	0.3	0.4	0.5	0.9

11

Line number of person	(240)	Line number of respondent	(241)	
7a. What is . . . 's principal means of transportation to work?				8d. Was . . . 's place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c(4)?
(242) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } →				(248) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Don't know
(243) 1 <input type="checkbox"/> Drives alone – Skip to 8a 2 <input type="checkbox"/> Shares driving } 3 <input type="checkbox"/> Drives others } Skip to 7c 4 <input type="checkbox"/> Rides with someone else } 5 <input type="checkbox"/> Walks only – Skip to 8a 6 <input type="checkbox"/> Works at home – Skip to 12a 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means – Specify _____				9. What time does . . . usually leave for work? (249) _____ Time (250) 1 <input type="checkbox"/> a.m. 2 <input type="checkbox"/> p.m.
b. Does . . . usually ALSO use a car for part of the trip to work? (244) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No – Skip to 8a				10. How long does it usually take . . . to get from home to work? (251) _____ Minutes
c. How many people, including . . . , usually ride in the car to work? (245) _____ Number				11. What is . . . 's ONE-WAY distance from home to work? (252) _____ Miles OR 0 <input type="checkbox"/> Less than 1 mile
8a. Does . . . usually WORK at the same location each day? (246) 1 <input type="checkbox"/> Yes – Skip to 8c 2 <input type="checkbox"/> No				12a. In the last year, has . . . changed his principal means of transportation to work? (253) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No – Skip to 13
b. Does . . . usually REPORT to the same location to begin work each day? (247) 3 <input type="checkbox"/> Yes 4 <input type="checkbox"/> No – Skip to 12a				b. What was . . . 's principal means of transportation to work (prior to the change)? (254) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } → (255) 1 <input type="checkbox"/> Drove alone 2 <input type="checkbox"/> Shared driving 3 <input type="checkbox"/> Drove others 4 <input type="checkbox"/> Rode with someone else 5 <input type="checkbox"/> Walked only 6 <input type="checkbox"/> Worked at home 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means – Specify _____
c. Where is . . . 's usual place of work? (1) Company or business establishment name _____ _____ (2) Address (Number and street) Note – If address (number and street name) are not known, enter building name, shopping center name, or other physical location description. _____ _____ (3) Names of nearest intersecting streets _____ _____ (4) Name of city, town, village, borough, etc. _____ _____ (5) County _____ State ZIP code _____				13. If "Yes" marked in 12a – ASK Compared to . . . 's previous means of transportation to work (Given in 12b), how satisfied is . . . with his present means of transportation to work – much more, more, about the same, less or much less satisfied? (256) 1 <input type="checkbox"/> Much more satisfied 2 <input type="checkbox"/> More satisfied 3 <input type="checkbox"/> About the same satisfaction 4 <input type="checkbox"/> Less satisfied 5 <input type="checkbox"/> Much less satisfied 6 <input type="checkbox"/> Don't know 7 <input type="checkbox"/> Did not work last year
				If "No" marked in 12a – ASK Compared to a year ago, how satisfied is . . . now with his principal means of transportation to work – much more, more, about the same, less or much less satisfied? _____
INTERVIEWER				Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a–e on page 19 of AHS-52 questionnaire.

Appendix C—Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker *usually* carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

The largest city in an SMSA is always a central city.

One or two additional cities may also be named central cities on the basis and in the order of the following criteria:

- a. The additional city or cities have at least 250,000 inhabitants.
- b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "-" means "rounds to or represents zero." Three dots "..." means "not applicable."

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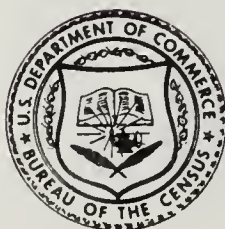
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Selected Characteristics of Travel to Work in the New Orleans SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the New Orleans SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the New Orleans SMSA in 1975, about 151,000 workers, was comprised of persons who both lived and worked in New Orleans city (table 1). In comparison, about 104,000 workers both lived and worked in the suburbs. Approximately 65,000 of the workers who lived in the suburbs commuted into New Orleans to work, while only about 23,000 of the workers who lived in New Orleans made the reverse trip from the city to suburban employment.

MEANS OF TRANSPORTATION TO WORK

Of the approximately 403,000 workers living in the New Orleans SMSA in 1975, the survey results show that the majority (61 percent) usually drove to work alone (table 2). The proportion who carpooled to work (21 percent) was larger than the proportion who used public transportation (about 12 percent), while 4 percent walked, and 1 percent each worked at home and used other means. Workers who lived in the suburbs were more likely to drive alone to work

(69 percent) than residents of the city (52 percent), while workers who lived in New Orleans were much more likely to use public transportation (22 percent) than suburban residents (3 percent).

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were more likely than men to carpool or use public transportation (table 3).

Race. Black workers showed a lower incidence of driving alone to work (about 46 percent) than White¹ workers (66 percent), and a correspondingly higher incidence of using public transportation (27 percent compared with 7 percent). The proportions of Black workers and White workers who traveled in carpools, however, were not significantly different (table 3).

Household relationship. Female household heads were much less likely to drive alone to work and much more likely to use public transportation than male household heads in 1975 (table 3). Comparing working wives with female household heads, the data indicate that the wives were more likely to drive alone or carpool, and less likely to use public transit than female heads of households. Thirty-one percent of the female heads used public transportation compared with 14 percent of the working wives.

Earnings. Comparing the three most widely used means of transportation, workers who drove alone to work had the highest median earnings (\$9,545), followed by workers in carpools (\$7,705) and public transit riders (\$4,378).

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was about 8 miles in 1975 (table 4). Workers who drove alone traveled the average distance to get to work, while workers who carpooled traveled slightly farther (about 10 miles). Public transportation users, however, traveled only about 6 miles on the average to get to work.

Travel time by means of transportation. The average commuting trip in the SMSA took about 23 minutes in 1975 (table 5). Workers who drove alone took about 20 minutes to get to work, while the figure for those who carpooled was 26 minutes. Public transportation users, on the other hand, spent an average of about 35 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 4,746 sample households in the New Orleans SMSA were eligible to answer the inquiries contained in the Travel-to-Work Supplement.

The interviews resulted in responses from 9,059 workers 14 years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)	SURVEY GROUP II (1975 to 1976)	SURVEY GROUP III (1976 to 1977)
Albany-Schenectady-Troy, N.Y.	Atlanta, Ga.*	Allentown-Bethlehem-Easton, Pa.-N.J.
Anaheim-Santa Ana-Garden Grove, Calif.	Chicago, Ill.*	Baltimore, Md.
Boston, Mass.*	Cincinnati, Ohio-Ky.-Ind.	Birmingham, Ala.
Dallas, Tex.	Colorado Springs, Colo.	Buffalo, N.Y.
Detroit, Mich.*	Columbus, Ohio	Cleveland, Ohio
Fort Worth, Tex.	Hartford, Conn.	Denver, Colo.
Los Angeles-Long Beach, Calif.*	Kansas City, Mo.-Kans.	Grand Rapids, Mich.
Madison, Wis.†	Miami, Fla.	Honolulu, Hawaii
Memphis, Tenn.-Ark.	Milwaukee, Wis.	Houston, Tex.*
Minneapolis-St. Paul, Minn.	New Orleans, La.	Indianapolis, Ind.
Newark, N.J.	Newport News-Hampton, Va.	Las Vegas, Nev.
Orlando, Fla.	Paterson-Clifton-Passaic, N.J.	Louisville, Ky.-Ind.
Phoenix, Ariz.	Philadelphia, Pa.-N.J.*	New York, N.Y.*
Pittsburgh, Pa.	Portland, Oreg.-Wash.	Oklahoma City, Okla.
Saginaw, Mich.	Rochester, N.Y.	Omaha, Nebr.-Iowa
Salt Lake City, Utah	San Antonio, Tex.	Providence-Pawtucket-Warwick, R.I.- Mass.
Spokane, Wash.	San Bernardino-Riverside-Ontario, Calif.	Raleigh, N.C.
Tacoma, Wash.	San Diego, Calif.	Sacramento, Calif.
Washington, D.C.-Md.-Va.*	San Francisco-Oakland, Calif.*	St. Louis, Mo.-Ill.*
Wichita, Kans.	Springfield-Chicopee-Holyoke, Mass.-Conn.	Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group I are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the New Orleans SMSA

Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside the SMSA			Outside the SMSA		
			Total	New Orleans city	Outside central city			
SMSA.....	403	355	344	216	127	11	45	3
New Orleans city.....	197	177	175	151	23	3	19	1
Outside central city.....	206	178	169	65	104	9	26	2
PERCENT DISTRIBUTION								
SMSA.....	[100.0]	100.0	96.9	61.0	35.9	3.1	[11.2]	[0.8]
New Orleans city.....	[100.0]	100.0	98.6	85.4	13.2	1.4	[9.6]	[0.7]
Outside central city.....	[100.0]	100.0	95.2	36.7	58.5	4.8	[12.8]	[1.0]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the New Orleans SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	403	197	206	100.0	100.0	100.0
Auto or truck.....	328	139	189	81.2	70.3	91.6
Drives alone.....	244	103	141	60.5	52.1	68.6
Carpool.....	84	36	47	20.7	18.3	23.0
Public transportation.....	50	43	7	12.4	21.8	3.3
Walks only.....	16	11	5	3.9	5.5	2.4
Other means.....	5	2	3	1.3	1.1	1.6
Bicycle.....	2	1	1	0.5	0.6	0.4
Motorcycle.....	2	-	1	0.4	-	0.7
All other means.....	2	1	1	0.4	0.3	0.5
Works at home.....	5	2	2	1.1	1.2	1.1

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the New Orleans SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thou- sands)	Percent by means of transportation						
		Total	Auto or truck		Public trans- porta- tion	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	403	100.0	60.5	20.7	12.4	3.9	1.3	1.1
SEX								
Male.....	249	100.0	67.2	19.4	7.6	3.1	1.9	0.9
Female.....	154	100.0	49.7	22.9	20.0	5.3	0.5	1.6
RACE								
White and other	299	100.0	65.6	21.0	7.2	3.2	1.6	1.3
Black.....	104	100.0	45.9	19.9	27.1	5.8	0.5	0.3
HOUSEHOLD RELATIONSHIP								
Head.....	257	100.0	65.0	18.7	10.8	3.3	1.2	1.0
Male.....	211	100.0	69.2	19.4	6.4	2.6	1.4	1.0
Female.....	46	100.0	45.4	15.9	30.6	6.6	0.7	1.0
Wife of head.....	81	100.0	53.8	25.4	14.0	4.2	0.2	2.3
Other member.....	66	100.0	51.3	22.6	16.5	6.1	3.2	0.0
EARNINGS								
Without earnings or not reported.....	32	100.0	60.1	14.2	1.5	7.1	2.2	7.0
With earnings.....	371	100.0	60.6	21.3	12.6	3.6	1.3	0.0
\$1 to 5,999.....	142	100.0	47.1	21.7	22.1	6.4	1.7	1.0
\$6,000 to 9,999.....	83	100.0	61.7	23.0	11.4	3.0	0.8	0.0
\$10,000 to 14,999.....	85	100.0	71.3	20.8	5.2	1.1	1.2	0.0
\$15,000 to 24,999.....	48	100.0	74.7	19.2	2.3	1.7	1.0	0.0
\$25,000 or more	14	100.0	75.5	18.7	3.6	0.7	1.4	0.0
Median earnings.....	\$7,903	...	\$9,545	\$7,705	\$4,378	\$4,317	\$6,245	\$3,88
Mean earnings.....	\$9,295	...	\$10,526	\$9,074	\$5,237	\$5,280	\$7,903	\$5.85

Table 4. Principal Means of Transportation, by Distance to Work, for the New Orleans SMSA

Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	353	100.0	9.5	16.3	18.2	28.3	15.2	8.1	3.7	0.7	5.6	7.6
Drives alone.....	211	100.0	6.4	17.3	18.4	29.5	15.3	8.9	3.5	0.6	5.8	7.6
Carpool.....	76	100.0	4.5	10.8	15.8	29.9	20.1	10.4	6.8	1.7	7.7	10.4
Public transportation.....	46	100.0	3.2	23.3	26.3	30.2	12.3	3.7	0.9	-	4.3	5.5
Walks only.....	16	100.0	91.6	7.7	0.6	-	-	-	-	-	-	0.1
Other means.....	5	100.0	15.2	19.6	26.1	23.9	8.7	4.3	4.3	-	3.7	5.3

¹Excludes workers with no fixed place of work and workers who worked at home.

Table 5. Principal Means of Transportation, by Travel Time to Work, for the New Orleans SMSA

Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	353	100.0	14.4	14.4	33.3	5.3	16.5	10.7	1.0	4.6	20.9	22.6
Drives alone.....	211	100.0	15.6	16.9	37.1	5.7	13.9	7.8	0.5	2.5	19.2	19.8
Carpool.....	76	100.0	9.5	12.0	33.2	5.9	18.6	14.2	1.6	5.1	23.1	26.0
Public transportation.....	46	100.0	1.3	4.5	21.8	4.5	29.4	21.6	2.4	14.7	32.6	34.6
Walks only.....	16	100.0	60.0	21.3	12.9	1.3	3.2	0.6	-	0.6	8.0	8.4
Other means.....	5	100.0	13.0	15.2	45.7	-	15.2	6.5	-	2.2	19.0	20.2

¹Excludes workers with no fixed place of work and workers who worked at home.

Appendix A — Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 4,746 housing units were eligible for interview in AHS. Of these sample units, 231 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or, for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 422 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 9,104 persons 14 years and older. Of these, 45 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is not 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{Weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA a noninterview factor was computed separately for 56 noninterview cells.

A ratio estimation procedure was then employed for all sample housing units from the permit-issuing universe. This factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, a person ratio estimate factor was calculated for each sector.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 3,500 conventional new construction units and 1,800 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the

accuracy of the estimates depends on both the sampling and nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 and A-2 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of

standard errors for estimates of zero and zero percent. These estimates of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 154,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 3,460. Consequently, the 68-percent confidence interval, as shown by these data, is from 150,540 to 157,460. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 148,460 to 159,540 workers with 90-percent confidence and within the interval from 147,080 to 160,920 with 95-percent confidence.

Table 3 also shows that of the 154,000 female workers, 20.0 percent commuted by means of public transportation. Interpolation in table A-2 of the appendix shows that the standard error of this percent is approximately 1.0 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 19.0 to 21.0 percent; the 90-percent confidence interval is from 18.4 to 21.6 percent; and the 95-percent confidence interval is from 18.0 to 22.0 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 7.6 percent of the male workers in this SMSA commuted by means of public transportation. Thus, the apparent difference, as shown by these data, between the percentage of public transportation use by males and females is 12.4 percent. Table A-2 of the appendix shows the standard error of 7.6 percent on a base of 249,000 is approximately 0.5 percent, while the standard error of 20.0 percent is approximately 1.0 percent. Therefore, the standard error of the estimated difference of 12.4 percent is about

$$1.1 = \sqrt{(1.0)^2 + (0.5)^2}$$

Consequently, the 68-percent confidence interval for the 12.4 percent difference is from 11.3 to 13.5 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 10.6 to 14.2 percent, and the 95-percent confidence interval is from 10.2 to 14.6 percent. Thus, we can conclude with 95-percent confidence that the percentage of female workers who used public transportation in 1975 is greater than the percentage of male workers who used transit, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

1. Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.
2. Add to and subtract from 50 percent the standard error determined in step 1.
3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 19.2 minutes.

1. Using table A-2 of the appendix, the standard error of 50 percent on a base of 211,000 is found to be about 1.1 percent.
2. A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 47.8 and 52.2.
3. The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 32.5 percent of the persons fall in the intervals below the median interval, while 37.1 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{47.8 - 32.5}{37.1} \right) = 18.6$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{52.2 - 32.5}{37.1} \right) = 19.8$$

Thus, the 95-percent confidence interval on the estimated median is from 18.6 to 19.8 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} S^2}$$

where y is the size of the base, and b is a parameter which equals 96.0 for this SMSA, 95.9 for the central city, and 98.0 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for group i ; and $\bar{X}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{X}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 19.8 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min.	.156	4.5
10 to 14 min.	.169	12.0
15 to 24 min.	.371	19.5
25 to 29 min.	.057	27.0
30 to 34 min.	.139	32.0
35 to 49 min.	.078	42.0
50 to 59 min.	.005	54.5
60 min. or more	.025	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 234.3$$

The b parameter is equal to 96.0. Thus the standard error on 19.8 minutes, $\sigma_{\bar{x}}$, is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{96.0}{211,000} (234.3)} = 0.3 \text{ minutes}$$

Consequently, the 68-percent confidence interval is estimated to be from 19.5 to 20.1 minutes, the 90-percent confidence interval is from 19.3 to 20.3 minutes, and the 95-percent confidence interval is from 19.2 to 20.4 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the New Orleans, La. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

(68 chances out of 100. For explanation of symbols, see text)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	100	100	100	50,000.....	2,120	2,060	2,070
100.....	100	100	100	75,000.....	2,560	2,430	2,440
200.....	140	140	140	100,000.....	2,900	2,710	2,700
500.....	220	220	220	150,000.....	3,430	3,050	3,010
700.....	260	260	260	250,000.....	4,080	3,130	2,980
1,000.....	310	310	310	300,000.....	4,270	2,890	2,620
2,500.....	490	490	490	400,000.....	4,420	1,430	-
5,000.....	690	690	700	500,000.....	4,300	-	-
10,000.....	970	970	980	800,000.....	1,160	-	-
25,000.....	1,530	1,500	1,510				

Table A-2. Standard Errors for Estimated Percentage of Workers in the New Orleans, La. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	49.0	49.0	49.0	49.0	49.0	49.0
200.....	32.4	32.4	32.4	32.4	32.4	34.6
500.....	16.1	16.1	16.1	16.1	19.0	21.9
700.....	12.1	12.1	12.1	12.1	16.0	18.5
1,000.....	8.8	8.8	8.8	9.3	13.4	15.5
2,500.....	3.7	3.7	4.3	5.9	8.5	9.8
5,000.....	1.9	1.9	3.0	4.2	6.0	6.9
10,000.....	1.0	1.0	2.1	2.9	4.2	4.9
25,000.....	0.4	0.6	1.4	1.9	2.7	3.1
50,000.....	0.2	0.4	1.0	1.3	1.9	2.2
75,000.....	0.13	0.4	0.8	1.1	1.5	1.8
100,000.....	0.10	0.3	0.7	0.9	1.3	1.5
150,000.....	0.06	0.3	0.6	0.8	1.1	1.3
250,000.....	0.04	0.2	0.4	0.6	0.8	1.0
300,000.....	0.03	0.2	0.4	0.5	0.8	0.9
400,000.....	0.02	0.2	0.3	0.5	0.7	0.8
500,000.....	0.02	0.14	0.3	0.4	0.6	0.7
800,000.....	0.01	0.11	0.2	0.3	0.5	0.5

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person	(240)	Line number of respondent	(241)	If last worker in this household, mark this box <input type="checkbox"/>
7a. What is . . . 's principal means of transportation to work?				8d. Was . . . 's place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c(4)?
(242) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } }				(248) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Don't know
(243) 1 <input type="checkbox"/> Drives alone — Skip to 8a 2 <input type="checkbox"/> Shares driving } 3 <input type="checkbox"/> Drives others } } Skip to 7c 4 <input type="checkbox"/> Rides with someone else } 5 <input type="checkbox"/> Walks only — Skip to 8a 6 <input type="checkbox"/> Works at home — Skip to 12a 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means — Specify _____				9. What time does . . . usually leave for work? (249) _____ Time (250) 1 <input type="checkbox"/> a.m. 2 <input type="checkbox"/> p.m.
b. Does . . . usually ALSO use a car for part of the trip to work? (244) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No — Skip to 8a				10. How long does it usually take . . . to get from home to work? (251) _____ Minutes
c. How many people, including . . . , usually ride in the car to work? (245) _____ Number				11. What is . . . 's ONE-WAY distance from home to work? (252) _____ Miles OR 0 <input type="checkbox"/> Less than 1 mile
8a. Does . . . usually WORK at the same location each day? (246) 1 <input type="checkbox"/> Yes — Skip to 8c 2 <input type="checkbox"/> No				12a. In the last year, has . . . changed his principal means of transportation to work? (253) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No — Skip to 13
b. Does . . . usually REPORT to the same location to begin work each day? (247) 3 <input type="checkbox"/> Yes 4 <input type="checkbox"/> No — Skip to 12a				b. What was . . . 's principal means of transportation to work (prior to the change)? (254) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } } (255) 1 <input type="checkbox"/> Drove alone 2 <input type="checkbox"/> Shared driving 3 <input type="checkbox"/> Drove others 4 <input type="checkbox"/> Rode with someone else 5 <input type="checkbox"/> Walked only 6 <input type="checkbox"/> Worked at home 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means — Specify _____
c. Where is . . . 's usual place of work? (1) Company or business establishment name _____ _____ _____ (2) Address (Number and street) Note — If address (number and street name) are not known, enter building name, shopping center name, or other physical location description. _____ _____ _____ (3) Names of nearest intersecting streets _____ _____ _____ (4) Name of city, town, village, borough, etc. _____ _____ _____ (5) County _____ _____ State ZIP code _____ _____				13. If "Yes" marked in 12a — ASK Compared to . . . 's previous means of transportation to work (Given in 12b), how satisfied is . . . with his present means of transportation to work — much more, more, about the same, less or much less satisfied? (256) 1 <input type="checkbox"/> Much more satisfied 2 <input type="checkbox"/> More satisfied 3 <input type="checkbox"/> About the same satisfaction 4 <input type="checkbox"/> Less satisfied 5 <input type="checkbox"/> Much less satisfied 6 <input type="checkbox"/> Don't know 7 <input type="checkbox"/> Did not work last year If "No" marked in 12a — ASK Compared to a year ago, how satisfied is . . . now with his principal means of transportation to work — much more, more, about the same, less or much less satisfied? _____
<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border: 1px solid black; padding: 5px; transform: rotate(-90deg); transform-origin: left top;">INTERVIEWER</div> <div>Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a–e on page 19 of AHS-52 questionnaire.</div> </div>				

Appendix C—Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker *usually* carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "-" means "rounds to or represents zero." Three dots "..." means "not applicable."

Recent Demographic Estimates for the Countries and Regions of the World

Of every 10 people in the world today, four live in either China or India. Add the Soviet Union and the United States, and half the World's population is covered. The other half of the world's people are distributed among the remaining 196 countries and territories. Throughout the world, a perceptible decline in population growth rates has begun to emerge, with the persistent exception of Africa. In some areas the decrease is substantial, in others incipient; in general the decrease is no longer questionable. Over 70 percent of the world's population lives in countries where the growth rate was lower in 1976 than in 1966.



This publication presents reported and estimated demographic data for the 200 countries of the world with a population of at least 5,000 persons, and for world regions. Benchmark, or hard, data for each country include the enumerated and adjusted population from the latest census or survey, birth and death rates, annual rate of growth, life expectancy at birth, infant mortality rate, percent of population under age 15, median age of mother, median birth order, percent urban, and percent of labor force in agriculture. A projected estimate of the population of each country for 1977 as well as birth and death rates and the annual rate of growth for 1976 are shown. All benchmark data and projected estimates are annotated, and major sources are listed. Also included for each country are population figures for each census taken since 1950, and an annual series of population estimates for the years 1950 to 1977.

This report was prepared under a Resources Support Services Agreement with the Development Support Bureau, U.S. Agency for International Development.

U.S. Department of Commerce
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Series P-23, No. 97
Issued October 1979

Selected Characteristics of Travel to Work in the Kansas City SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the Kansas City SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the Kansas City SMSA in 1975, about 183,000 workers, was comprised of persons who both lived and worked in the suburbs (table 1). In comparison, about 143,000 workers both lived and worked in Kansas City. Approximately 113,000 workers who lived in the suburbs commuted into Kansas City to work, while only about 38,000 of the workers who lived in Kansas City made the reverse trip from the city to suburban employment.

MEANS OF TRANSPORTATION TO WORK

Of the approximately 535,000 workers living in the Kansas City SMSA in 1975, the survey results show that the majority (68 percent) usually drove to work alone (table 2). The proportion who carpooled to work (23 percent) was much larger than the proportion who used public transportation (about 4 percent), while 3 percent walked, 2 percent worked at home, and 1 percent used other means. Workers who lived in the suburbs were more likely to drive alone to work (72 percent) than residents of the city (61

percent), while workers who lived in Kansas City were more likely to use public transportation (9 percent) than suburban residents (1 percent).

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were more likely than men to carpool or use public transportation (table 3).

Race. Black workers showed a lower incidence of driving alone (about 58 percent) than White¹ workers (69 percent), and a correspondingly higher incidence of using public transportation (14 percent compared with 3 percent). The proportions of Black workers and White workers who traveled in carpools, however, were not significantly different (table 3).

Household relationship. Female household heads were less likely to drive alone to work and more likely to use public transportation than male household heads in 1975 (table 3). Comparing working wives with female household heads, the data indicate that the difference in driving alone to work was not significant, but the wives were more likely to carpool and less likely to use public transit than female heads of households. Thirty-one percent of the working wives used carpools to get to work, compared with 20 percent of the female heads of household.

Earnings. Comparing the three most widely used means of transportation, workers who drove alone to work had the highest median earnings (\$9,998), followed by workers in carpools (\$7,912) and users of public transit (\$5,315).

¹The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was about 9 miles in 1975 (table 4). Mean distance to work was the same as the SMSA average for workers who drove alone, while workers who carpooled traveled slightly farther (about 10 miles). Public transportation users, however, traveled only about 6 miles on the average to get to work.

Travel time by means of transportation. The average commuting trip in the SMSA took about 20 minutes in 1975 (table 5). Workers who drove alone took about 19 minutes to get to work, while the figure for those who carpooled was 23 minutes. Public transportation users, on the other hand, spent an average of about 34 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 4,684 sample households in the Kansas City SMSA were eligible to answer the inquiries contained in the Travel-to-Work Supplement. The interviews resulted in responses from 8,804 workers 14

years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)

Albany-Schenectady-Troy, N.Y.
Anaheim-Santa Ana-Garden Grove,
Calif.
Boston, Mass.*
Dallas, Tex.
Detroit, Mich.*
Fort Worth, Tex.
Los Angeles-Long Beach, Calif.*
Madison, Wis.†
Memphis, Tenn.-Ark.
Minneapolis-St. Paul, Minn.
Newark, N.J.
Orlando, Fla.
Phoenix, Ariz.
Pittsburgh, Pa.
Saginaw, Mich.
Salt Lake City, Utah
Spokane, Wash.
Tacoma, Wash.
Washington, D.C.-Md.-Va.*
Wichita, Kans.

SURVEY GROUP II (1975 to 1976)

Atlanta, Ga.*
Chicago, Ill.*
Cincinnati, Ohio-Ky.-Ind.
Colorado Springs, Colo.
Columbus, Ohio
Hartford, Conn.
Kansas City, Mo.-Kans.
Miami, Fla.
Milwaukee, Wis.
New Orleans, La.
Newport News-Hampton, Va.
Paterson-Clifton-Passaic, N.J.
Philadelphia, Pa.-N.J.*
Portland, Oreg.-Wash.
Rochester, N.Y.
San Antonio, Tex.
San Bernardino-Riverside-Ontario,
Calif.
San Diego, Calif.
San Francisco-Oakland, Calif.*
Springfield-Chicopee-Holyoke,
Mass.-Conn.

SURVEY GROUP III (1976 to 1977)

Allentown-Bethlehem-Easton, Pa.-N.J.
Baltimore, Md.
Birmingham, Ala.
Buffalo, N.Y.
Cleveland, Ohio
Denver, Colo.
Grand Rapids, Mich.
Honolulu, Hawaii
Houston, Tex.*
Indianapolis, Ind.
Las Vegas, Nev.
Louisville, Ky.-Ind.
New York, N.Y.*
Oklahoma City, Okla.
Omaha, Nebr.-Iowa
Providence-Pawtucket-Warwick, R.I.-
Mass.
Raleigh, N.C.
Sacramento, Calif.
St. Louis, Mo.-Ill.*
Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group III are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the Kansas City SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside the SMSA			Outside the SMSA		
			Total	Kansas City	Outside central city			
SMSA.....	535	482	478	257	221	4	50	3
Kansas City.....	198	183	182	143	38	1	15	1
Outside central city.....	337	300	296	113	183	3	36	2
PERCENT DISTRIBUTION								
SMSA.....	[100.0]	100.0	99.1	53.2	45.9	0.9	[9.4]	[0.5]
Kansas City.....	[100.0]	100.0	99.4	78.5	20.9	0.6	[7.4]	[0.4]
Outside central city.....	[100.0]	100.0	99.0	37.8	61.2	1.0	[10.5]	[0.5]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the Kansas City SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	535	198	337	100.0	100.0	100.0
Auto or truck.....	485	168	316	90.6	84.9	93.9
Drives alone.....	364	121	243	68.0	60.9	72.3
Carpool.....	121	48	73	22.5	24.0	21.7
Public transportation.....	20	17	3	3.8	8.8	0.8
Walks only.....	15	7	8	2.8	3.7	2.3
Other means.....	4	1	3	0.7	0.4	0.9
Bicycle.....	1	-	1	0.2	-	0.3
Motorcycle.....	2	-	2	0.4	-	0.5
All other means.....	1	-	1	0.1	-	0.1
Works at home.....	11	4	7	2.0	2.1	2.0

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the Kansas City SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thou- sands)	Percent by means of transportation						
		Total	Auto or truck		Public trans- porta- tion	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	535	100.0	68.0	22.6	3.8	2.8	0.7	2.0
SEX								
Male.....	313	100.0	75.0	18.3	2.4	2.1	1.1	1.3
Female.....	222	100.0	58.3	28.6	5.8	4.0	0.2	3.1
RACE								
White and other	483	100.0	69.1	22.4	2.7	2.9	0.8	2.1
Black.....	52	100.0	58.1	24.2	13.8	2.3	0.2	1.6
HOUSEHOLD RELATIONSHIP								
Head.....	330	100.0	73.6	18.2	3.7	2.2	0.7	1.5
Male.....	269	100.0	76.8	17.4	2.0	1.3	0.8	1.3
Female.....	61	100.0	59.7	20.1	10.9	6.1	0.5	2.5
Wife of head.....	123	100.0	59.8	31.1	3.1	2.2	0.1	3.7
Other member.....	82	100.0	57.9	27.3	5.1	6.6	1.7	1.6
EARNINGS								
Without earnings or not reported.....	45	100.0	60.4	19.8	3.3	5.9	1.3	9.3
With earnings.....	489	100.0	68.8	22.8	3.8	2.6	0.7	1.4
\$1 to 5,999.....	155	100.0	58.8	24.8	6.9	5.8	0.9	2.7
\$6,000 to 9,999.....	117	100.0	66.3	27.3	3.6	1.7	0.4	0.6
\$10,000 to 14,999.....	121	100.0	74.4	22.1	1.9	0.5	0.3	0.6
\$15,000 to 24,999.....	75	100.0	78.8	16.7	1.9	0.8	0.7	0.9
\$25,000 or more	23	100.0	86.2	10.2	0.4	0.9	0.9	1.3
Median earnings.....	\$9,028	...	\$9,998	\$7,912	\$5,315	\$3,739	\$8,034	\$3,492
Mean earnings.....	\$10,009	...	\$10,936	\$8,641	\$6,276	\$4,795	\$8,610	\$7,099

Table 4. Principal Means of Transportation, by Distance to Work, for the Kansas City SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	474	100.0	7.7	12.6	14.6	26.0	18.3	15.6	5.0	0.2	7.4	8.8
Drives alone.....	321	100.0	5.6	12.8	15.4	27.2	18.4	15.5	4.9	0.2	7.5	8.8
Carpool.....	115	100.0	3.1	12.2	12.3	24.5	20.8	20.0	6.8	0.3	9.1	10.3
Public transportation.....	20	100.0	2.6	12.2	26.5	35.2	17.3	5.6	0.5	-	5.7	6.2
Walks only.....	15	100.0	92.5	7.5	-	-	-	-	-	-	-	0.1
Other means.....	3	100.0	20.6	26.5	17.6	17.6	8.8	2.9	2.9	-	3.0	5.1

¹Excludes workers with no fixed place of work and workers who worked at home.**Table 5. Principal Means of Transportation, by Travel Time to Work, for the Kansas City SMSA**

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thou- sands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	474	100.0	16.0	15.1	34.5	7.8	15.1	9.2	0.5	1.8	20.0	20.1
Drives alone.....	321	100.0	16.5	16.3	36.2	7.9	14.8	7.3	0.3	0.8	19.3	18.9
Carpool.....	115	100.0	11.6	12.0	34.2	8.5	17.2	13.2	0.8	2.6	22.2	22.6
Public transportation.....	20	100.0	2.0	4.6	26.0	7.1	20.4	24.0	2.6	13.2	32.0	33.5
Walks only.....	15	100.0	55.8	28.6	9.5	2.0	2.7	0.7	-	-	8.6	8.3
Other means.....	3	100.0	35.3	8.8	38.2	2.9	5.9	2.9	-	2.9	15.8	16.7

¹Excludes workers with no fixed place of work and workers who worked at home.

Appendix A—Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 4,684 housing units were eligible for interview in AHS. Of these sample units, 210 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or, for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 472 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 8,848 persons 14 years and older. Of these, 44 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is not 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{Weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA, a noninterview factor was computed separately for 56 noninterview cells.

A ratio estimation procedure was then employed for all sample housing units from the permit-issuing universe. This factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement, the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, one person ratio estimate factor was calculated for the whole SMSA.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 4,700 conventional new construction units and 1,200 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and

nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 and A-2 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These

estimates of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 222,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 4,450. Consequently, the 68-percent confidence interval, as shown by these data, is from 217,550 to 226,450. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 214,880 to 229,120 female workers with 90-percent confidence and within the interval from 213,100 to 230,900 with 95-percent confidence.

Table 3 also shows that of the 222,000 female workers, 5.8 percent commuted by means of public transportation. Interpolation in table A-2 of the appendix shows that the standard error of this percent is approximately 0.6 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 5.2 to 6.4 percent; the 90-percent confidence interval is from 4.8 to 6.8 percent; and the 95-percent confidence interval is from 4.6 to 7.0 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard errors; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 2.4 percent of the male workers in this SMSA commuted by means of public transportation. Thus, the apparent difference, as shown by these data, between the percentage of transportation use by males and females is 3.4 percent. Table A-2 of the appendix shows the standard error of 2.4 percent on a base of 313,000 is approximately 0.3 percent, while the standard error of 5.8 percent is approximately 0.6 percent. Therefore, the standard error of the estimated difference of 3.4 is about

$$0.7 = \sqrt{(0.6)^2 + (0.3)^2}$$

Consequently, the 68-percent confidence interval for the 3.4 percent difference is from 2.7 to 4.1 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 2.3 to 4.5 percent, and the 95-percent confidence interval is from 2.0 to 4.8 percent. Thus, we can conclude with 95-percent confidence that the percentage of female workers who used public transportation in 1975 is greater than the percentage of male workers who used transit, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

1. Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.
2. Add to and subtract from 50 percent the standard error determined in step 1.
3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 19.3 minutes.

1. Using table A-2 of the appendix, the standard error of 50 percent on a base of 321,000 is found to be about 1.0 percent.
2. A 95-percent confidence interval on a median is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 48.0 and 52.0.
3. The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 32.8 percent of the persons fall in the intervals below the median interval, while 36.2 percent fall in the median interval itself. Thus, the lower limit on the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{48.0 - 32.8}{36.2} \right) = 18.7$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{52.0 - 32.8}{36.2} \right) = 19.8$$

Thus, the 95-percent confidence interval on the estimated median is from 18.7 to 19.8 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} S^2}$$

where y is the size of the base, and b is a parameter which equals 118.7 for this SMSA, 116.3 for the central city, and 118.5 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for group i ; and $\bar{X}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{X}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 18.9 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min.	.165	4.5
10 to 14 min.	.163	12.0
15 to 24 min.	.362	19.5
25 to 29 min.	.079	27.0
30 to 34 min.	.148	32.0
35 to 49 min.	.073	42.0
50 to 59 min.	.003	54.5
60 min. or more	.008	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 152.5$$

The b parameter is equal to 118.7. Thus the standard error on 18.9 minutes, $\sigma_{\bar{x}}$, is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{118.7}{321,000} (152.5)} = 0.2 \text{ minutes}$$

Consequently, the 68-percent confidence interval is estimated to be from 18.7 to 19.1 minutes, the 90-percent confidence interval is from 18.6 to 19.2 minutes, and the 95-percent confidence interval is from 18.5 to 19.3 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the Kansas City, Mo.-Kans. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

(68 chances out of 100. For explanation of symbols, see text)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	120	120	120	25,000.....	1,700	1,650	1,680
100.....	120	120	120	50,000.....	2,370	2,240	2,330
200.....	150	150	150	75,000.....	2,860	2,630	2,790
500.....	240	240	240	100,000.....	3,260	2,900	3,140
700.....	290	290	290	150,000.....	3,870	3,190	3,640
1,000.....	340	340	340	250,000.....	4,680	2,980	4,140
2,500.....	540	540	540	300,000.....	4,940	2,410	4,200
5,000.....	770	760	770	500,000.....	5,320	-	3,070
10,000.....	1,080	1,060	1,080	900,000.....	2,470	-	-

Table A-2. Standard Errors for Estimated Percentage of Workers in the Kansas City, Mo.-Kans. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	54.3	54.3	54.3	54.3	54.3	54.5
200.....	37.2	37.2	37.2	37.2	37.2	38.5
500.....	19.2	19.2	19.2	19.2	21.1	24.4
700.....	14.5	14.5	14.5	14.5	17.8	20.6
1,000.....	10.6	10.6	10.6	10.6	14.9	17.2
2,500.....	4.5	4.5	4.7	6.5	9.4	10.9
5,000.....	2.3	2.3	3.4	4.6	6.7	7.7
10,000.....	1.2	1.2	2.4	3.3	4.7	5.4
25,000.....	0.5	0.7	1.5	2.1	3.0	3.4
50,000.....	0.2	0.5	1.1	1.5	2.1	2.4
75,000.....	0.2	0.4	0.9	1.2	1.7	2.0
100,000.....	0.12	0.3	0.8	1.0	1.5	1.7
150,000.....	0.08	0.3	0.6	0.8	1.2	1.4
250,000.....	0.05	0.2	0.5	0.7	0.9	1.1
300,000.....	0.04	0.2	0.4	0.6	0.9	1.0
500,000.....	0.02	0.15	0.3	0.5	0.7	0.8
900,000.....	0.01	0.11	0.3	0.3	0.5	0.6

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person	(240)	Line number of respondent	(241)	
				If last worker in this household, mark this box <input type="checkbox"/>
7a. What is . . . 's principal means of transportation to work? <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>(242) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } →</p> <p>(243) 1 <input type="checkbox"/> Drives alone — Skip to 8a 2 <input type="checkbox"/> Shares driving } 3 <input type="checkbox"/> Drives others } Skip to 7c 4 <input type="checkbox"/> Rides with someone else } 5 <input type="checkbox"/> Walks only — Skip to 8a 6 <input type="checkbox"/> Works at home — Skip to 12a 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means — Specify _____</p> </div> <div style="width: 5%; text-align: center;">}</div> <div style="width: 50%;"> <p>b. Does . . . usually ALSO use a car for part of the trip to work? (244) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No — Skip to 8a</p> <p>c. How many people, including . . . , usually ride in the car to work? (245) _____ Number</p> </div> </div>				8d. Was . . . 's place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c(4))? (248) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Don't know
				9. What time does . . . usually leave for work? (249) _____ Time (250) 1 <input type="checkbox"/> a.m. 2 <input type="checkbox"/> p.m.
				10. How long does it usually take . . . to get from home to work? (251) _____ Minutes
				11. What is . . . 's ONE-WAY distance from home to work? (252) _____ Miles OR 0 <input type="checkbox"/> Less than 1 mile
				12a. In the last year, has . . . changed his principal means of transportation to work? (253) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No — Skip to 13
b. What was . . . 's principal means of transportation to work (prior to the change)? (254) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } → (255) 1 <input type="checkbox"/> Drove alone 2 <input type="checkbox"/> Shared driving 3 <input type="checkbox"/> Drove others 4 <input type="checkbox"/> Rode with someone else 5 <input type="checkbox"/> Walked only 6 <input type="checkbox"/> Worked at home 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means — Specify _____				
8a. Does . . . usually WORK at the same location each day? (246) 1 <input type="checkbox"/> Yes — Skip to 8c 2 <input type="checkbox"/> No b. Does . . . usually REPORT to the same location to begin work each day? (247) 3 <input type="checkbox"/> Yes 4 <input type="checkbox"/> No — Skip to 12a c. Where is . . . 's usual place of work? (1) Company or business establishment name _____ _____ _____ (2) Address (Number and street) Note — If address (number and street name) are not known, enter building name, shopping center name, or other physical location description. _____ _____ _____ (3) Names of nearest intersecting streets _____ _____ _____ (4) Name of city, town, village, borough, etc. _____ _____ _____ (5) County _____ _____ _____ State ZIP code _____				13. If "Yes" marked in 12a — ASK Compared to . . . 's previous means of transportation to work (Given in 12b), how satisfied is . . . with his present means of transportation to work — much more, more, about the same, less or much less satisfied? (256) 1 <input type="checkbox"/> Much more satisfied 2 <input type="checkbox"/> More satisfied 3 <input type="checkbox"/> About the same satisfaction 4 <input type="checkbox"/> Less satisfied 5 <input type="checkbox"/> Much less satisfied 6 <input type="checkbox"/> Don't know 7 <input type="checkbox"/> Did not work last year
				If "No" marked in 12a — ASK Compared to a year ago, how satisfied is . . . now with his principal means of transportation to work — much more, more, about the same, less or much less satisfied?
				<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> INTERVIEWER </div> <div> Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a–e on page 19 of AHS-52 questionnaire. </div> </div>

Appendix C—Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker *usually* carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

- The largest city in an SMSA is always a central city.
- One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

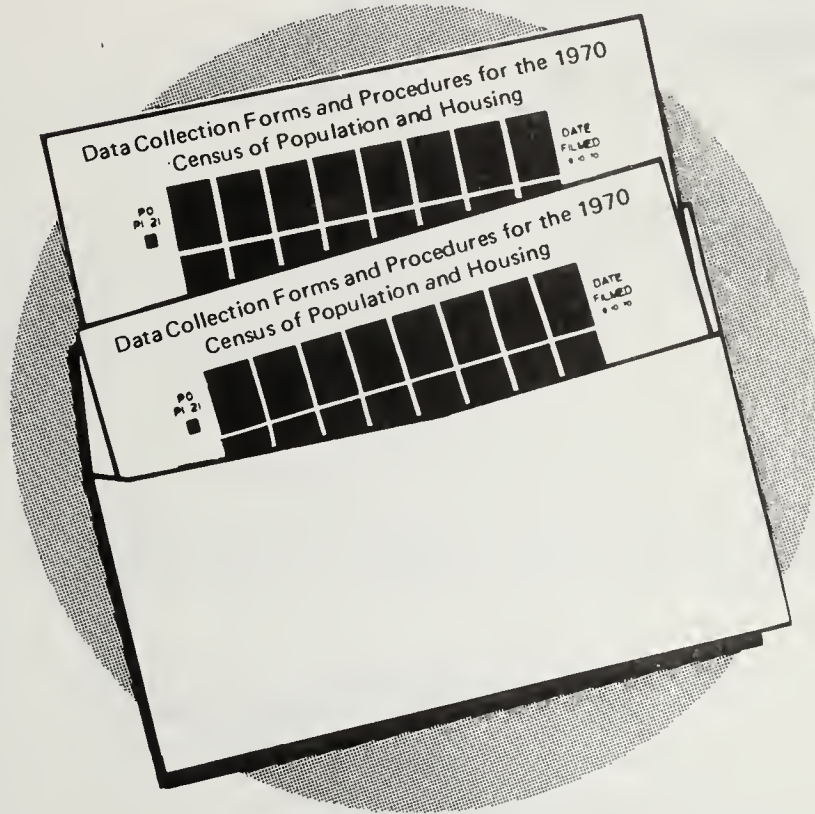
Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "-" means "rounds to or represents zero." Three dots "..." means "not applicable."

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Series P-23, No. 98
Issued November 1979

Selected Characteristics of Travel to Work in the Portland SMSA: 1975

INTRODUCTION

This report is one of a series of publications of final data for selected standard metropolitan statistical areas (SMSA's), from the Travel-to-Work Supplement to the Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT). The AHS is conducted for the U.S. Department of Housing and Urban Development. The data in this report are based on interviews of households in the Portland, Oreg.-Wash. SMSA completed during the period from April 1975 through March 1976. Preliminary data from the Travel-to-Work Supplement, covering the first 4 months of the period, were previously published in Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975."

MAJOR COMMUTING FLOWS

The largest commuting flow in the Portland SMSA in 1975, about 154,000 workers, was comprised of persons who both lived and worked in the suburbs (table 1). About 107,000 workers both lived and worked in Portland city, while a comparable figure of about 103,000 workers lived in the suburbs and commuted into Portland to work. Only about 26,000 of the workers who lived in Portland, however, made the reverse trip from the city to suburban employment.

MEANS OF TRANSPORTATION TO WORK

Of the approximately 442,000 workers living in the Portland SMSA in 1975, the survey results show that the majority (66 percent) usually drove to work alone (table 2). The proportion who carpooled to work (18 percent) was larger than the proportion who used public transportation (about 8 percent), while 4 percent walked, and about 2 percent each worked at home and used other means. Workers who lived in the suburbs were more likely to drive alone to work (70 percent) than residents of the city (57 percent), while

workers who lived in Portland were more likely to use public transportation (15 percent) than suburban residents (5 percent).

SELECTED CHARACTERISTICS OF COMMUTERS BY MEANS OF TRANSPORTATION

Sex. A greater proportion of men than women drove alone to work in 1975, while women were more likely than men to carpool or use public transportation (table 3).

Race. Black workers showed a lower incidence of driving alone (50 percent) than White¹ workers (66 percent), and a correspondingly higher incidence of using public transportation (24 percent compared with 8 percent). The proportions of Black workers and White workers who traveled in carpools, however, were not significantly different (table 3).

Household relationship. Female household heads were much less likely to drive alone to work and much more likely to use public transportation than male household heads in 1975 (table 3). Comparing working wives with female household heads, the data indicate that the wives were more likely to carpool, and less likely to use public transit than female heads of households. Nineteen percent of the female heads used public transportation compared with 9 percent of the working wives.

Earnings. Comparing the three most widely used means of transportation, there is some evidence that workers who drove alone to work had higher median earnings (\$10,121), than workers in carpools (\$9,363), while the figure for public transit riders (\$6,200) was the lowest of the three.

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation. Among all workers in the metropolitan area, the average commuting trip was about 8 miles in 1975 (table 4). Mean distance to work for workers who drove alone was about the same as the SMSA average, while workers who carpooled traveled slightly farther (about 10 miles). Public transportation users, on the other hand, traveled about 7 miles on the average to get to work.

Travel time by means of transportation. The average commuting trip in the SMSA took about 20 minutes in 1975 (table 5). Workers who drove alone took about 18 minutes to get to work, while the figure for those who carpooled was 22 minutes. Public transportation users, on the other hand, spent an average of about 32 minutes getting to work.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during the period from April 1975 through March 1976, as part of the enumeration for the Annual Housing Survey Group II SMSA sample. In all, the occupants of 4,875 sample households in the Portland, Oreg.-Wash. SMSA were eligible to answer the inquiries contained in the Travel-to-Work

Supplement. The interviews resulted in responses from 9,218 workers 14 years old or over. A facsimile of the Travel-to-Work Supplement can be found in appendix B.

The Travel-to-Work Supplement was also included for the 1975 Annual Housing Survey National sample, and the 1976-77 and 1977-78 SMSA samples. Each of the SMSA samples contained about 140,000 households spread over 20 SMSA's; for operational reasons the 1975-76 enumeration covered 21 areas. Therefore, the 3-year cycle of SMSA samples resulted in coverage of about 420,000 metropolitan households in 60 SMSA's. (See List of SMSA's by Survey Group.) Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. Each remaining SMSA contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. A more detailed description of the survey design and sampling procedures can be found in appendix A.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)	SURVEY GROUP II (1975 to 1976)	SURVEY GROUP III (1976 to 1977)
Albany-Schenectady-Troy, N.Y.	Atlanta, Ga.*	Allentown-Bethlehem-Easton, Pa.-N.J.
Anaheim-Santa Ana-Garden Grove, Calif.	Chicago, Ill.*	Baltimore, Md.
Boston, Mass.*	Cincinnati, Ohio-Ky.-Ind.	Birmingham, Ala.
Dallas, Tex.	Colorado Springs, Colo.	Buffalo, N.Y.
Detroit, Mich.*	Columbus, Ohio	Cleveland, Ohio
Fort Worth, Tex.	Hartford, Conn.	Denver, Colo.
Los Angeles-Long Beach, Calif.*	Kansas City, Mo.-Kans.	Grand Rapids, Mich.
Madison, Wis.†	Miami, Fla.	Honolulu, Hawaii
Memphis, Tenn.-Ark.	Milwaukee, Wis.	Houston, Tex.*
Minneapolis-St. Paul, Minn.	New Orleans, La.	Indianapolis, Ind.
Newark, N.J.	Newport News-Hampton, Va.	Las Vegas, Nev.
Orlando, Fla.	Paterson-Clifton-Passaic, N.J.	Louisville, Ky.-Ind.
Phoenix, Ariz.	Philadelphia, Pa.-N.J.*	New York, N.Y.*
Pittsburgh, Pa.	Portland, Oreg.-Wash.	Oklahoma City, Okla.
Saginaw, Mich.	Rochester, N.Y.	Omaha, Nebr.-Iowa
Salt Lake City, Utah	San Antonio, Tex.	Providence-Pawtucket-Warwick, R.I.
Spokane, Wash.	San Bernardino-Riverside-Ontario, Calif.	Mass.
Tacoma, Wash.	San Diego, Calif.	Raleigh, N.C.
Washington, D.C.-Md.-Va.*	San Francisco-Oakland, Calif.*	Sacramento, Calif.
Wichita, Kans.	Springfield-Chicopee-Holyoke, Mass.-Conn.	St. Louis, Mo.-Ill.*
		Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group I are presently only available in **Current Population Reports**, Series P-23, No. 72, "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976." No data for the SMSA's in Survey Group I have yet been released.

Data from the 1975 National Travel-to-Work Supplement are currently available in **Current Population Reports**, Series P-23, No. 99, "The Journey to Work in the United States:

1975" and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Table 1. Place of Residence, by Place of Work, for the Portland SMSA

Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside the SMSA			Outside the SMSA		
			Total	Portland city	Outside central city			
SMSA.....	442	394	389	210	179	5	44	3
Portland city.....	146	134	133	107	26	1	12	1
Outside central city.....	296	261	257	103	154	4	33	3
PERCENT DISTRIBUTION								
SMSA.....	[100.0]	100.0	98.8	53.3	45.4	1.2	[10.0]	[0.8]
Portland city.....	[100.0]	100.0	99.3	80.2	19.2	0.7	[8.0]	[0.6]
Outside central city.....	[100.0]	100.0	98.5	39.6	59.0	1.5	[11.0]	[0.8]

Note: Percents in brackets, [], are of all workers.

Table 2. Principal Means of Transportation to Work, by Place of Residence, for the Portland SMSA

(Workers 14 years old and over. Numbers in thousands. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	SMSA			Percent distribution		
	Total	Inside central city (cities)	Outside central city (cities)	SMSA		
				Total	Inside central city (cities)	Outside central city (cities)
All workers.....	442	146	296	100.0	100.0	100.0
Auto or truck.....	369	108	262	83.6	73.7	88.5
Drives alone.....	289	84	206	65.5	57.2	69.6
Carpool.....	80	24	56	18.1	16.6	18.9
Public transportation.....	36	21	15	8.2	14.6	5.0
Walks only.....	19	11	8	4.2	7.5	2.6
Other means.....	7	3	4	1.6	2.1	1.4
Bicycle.....	4	2	2	0.9	1.2	0.8
Motorcycle.....	2	1	1	0.5	0.7	0.4
All other means.....	1	-	1	0.2	-	0.2
Works at home.....	11	3	8	2.4	2.1	2.6

Table 3. Principal Means of Transportation to Work, by Selected Characteristics of Commuters, for the Portland SMSA

(Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Characteristics	All workers (thou- sands)	Percent by means of transportation						
		Total	Auto or truck		Public trans- porta- tion	Walks only	Other means	Works at home
			Drives alone	Carpool				
All workers.....	442	100.0	65.5	18.1	8.2	4.2	1.6	2.4
SEX								
Male.....	267	100.0	71.0	16.8	5.2	3.1	2.2	1.7
Female.....	175	100.0	57.1	20.1	12.7	5.8	0.7	3.5
RACE								
White and other	436	100.0	65.7	18.1	7.9	4.2	1.6	2.4
Black.....	6	100.0	50.0	17.7	24.2	8.1	-	1.6
HOUSEHOLD RELATIONSHIP								
Head.....	277	100.0	69.8	15.8	7.1	3.6	1.6	2.1
Male.....	230	100.0	72.7	16.5	4.7	2.7	1.7	1.8
Female.....	47	100.0	55.5	12.5	19.1	8.2	0.9	3.9
Wife of head.....	98	100.0	60.4	23.5	9.0	3.0	0.3	4.0
Other member.....	67	100.0	55.2	19.9	11.4	8.6	3.7	1.3
EARNINGS								
Without earnings or not reported.....	57	100.0	60.2	12.3	7.9	7.2	2.5	10.0
With earnings.....	385	100.0	66.3	19.0	8.2	3.8	1.5	1.3
\$1 to 5,999.....	121	100.0	57.7	17.6	12.7	7.0	2.1	2.9
\$6,000 to 9,999.....	86	100.0	65.6	20.8	9.1	2.9	0.9	0.8
\$10,000 to 14,999.....	98	100.0	70.3	20.7	4.5	2.4	1.7	0.4
\$15,000 to 24,999.....	67	100.0	74.0	18.1	4.5	1.8	1.3	0.3
\$25,000 or more	13	100.0	80.5	9.3	8.5	-	-	2.3
Median earnings.....	\$9,305	...	\$10,121	\$9,363	\$6,200	\$4,443	\$8,096	\$2,845
Mean earnings.....	\$9,942	...	\$10,657	\$9,496	\$7,892	\$5,879	\$8,206	\$6,645

Table 4. Principal Means of Transportation, by Distance to Work, for the Portland SMSA

Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thousands)	Percent distribution by distance to work (miles)									Median	Mean
		Total	Less than 1	1 to 2	3 to 4	5 to 9	10 to 14	15 to 24	25 to 49	50 or more		
All workers ¹	387	100.0	8.1	12.5	15.3	29.9	17.9	12.6	3.1	0.5	6.8	8.1
Ways alone.....	255	100.0	4.7	13.3	16.3	30.4	18.5	13.3	3.1	0.4	7.1	8.3
Pool.....	74	100.0	4.3	9.2	13.4	30.3	21.0	16.2	4.6	1.1	8.3	10.1
Public transportation.....	34	100.0	0.9	11.1	17.8	42.6	18.7	7.3	1.7	-	6.9	7.4
Ways only.....	18	100.0	86.3	13.7	-	-	-	-	-	-	0.1	0.2
Other means.....	6	100.0	13.3	28.3	28.3	20.0	3.3	8.3	-	-	3.1	7.7

Excludes workers with no fixed place of work and workers who worked at home.

Table 5. Principal Means of Transportation, by Travel Time to Work, for the Portland SMSA

Workers 14 years old and over. SMSA as of the 1970 census. For explanation of symbols, see text)

Means of transportation	Total ¹ (thousands)	Percent distribution by travel time to work (minutes)									Median	Mean
		Total	Less than 10	10 to 14	15 to 24	25 to 29	30 to 34	35 to 49	50 to 59	60 or more		
All workers ¹	387	100.0	16.6	17.6	35.7	6.6	12.5	8.4	0.4	2.2	18.9	19.5
Ways alone.....	255	100.0	18.0	19.1	37.4	6.3	11.7	6.2	0.3	1.0	18.0	17.8
Pool.....	74	100.0	10.7	16.9	35.9	9.7	12.3	11.4	0.5	2.8	20.8	21.8
Public transportation.....	34	100.0	1.2	5.5	28.0	6.1	24.5	21.3	1.7	11.4	31.4	32.1
Ways only.....	18	100.0	52.0	21.7	21.7	1.7	1.7	1.7	-	-	9.2	9.4
Other means.....	6	100.0	15.0	21.7	45.0	-	10.0	8.3	-	1.7	17.6	18.1

¹Excludes workers with no fixed place of work and workers who worked at home.

Appendix A—Source and Reliability of the Estimates

SAMPLE DESIGN

The DOT Travel-to-Work Supplement and The Annual Housing Survey

The DOT Travel-to-Work Supplement data are based on interviews completed during the period April 1975 through March 1976 in 21 SMSA's as part of the enumeration for the Year II Annual Housing Survey (AHS) sponsored by the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-SMSA questionnaire included a supplementary group of questions pertaining to travel-to-work. In the four largest SMSA's, the survey sample consisted of about 15,000 housing units, and for the remaining 17 SMSA's, the survey was based on a sample of about 5,000 housing units.

In this SMSA, 4,875 housing units were eligible for interview in AHS. Of these sample units, 157 interviews were not obtained because, for occupied sample units, the occupants were not at home after repeated visits or were unavailable for some other reason; or, for vacant units, no informed respondent could be found after repeated visits. In addition to units eligible for interview, 363 units were visited but found not to be eligible for interview because they were condemned, unfit, demolished, converted to group quarters use, etc. Within the interviewed households of this SMSA there were 9,264 persons 14 years and older. Of these, 46 persons did not respond to the DOT Travel-to-Work Supplement.

Selection of the AHS-SMSA sample. The sample for the SMSA's which are 100 percent permit-issuing was selected from two sample frames—units enumerated in the 1970 Census of Population and Housing in areas under the jurisdiction of permit-issuing offices (the permit-issuing universe) and units constructed in permit-issuing areas since the 1970 census (the new construction universe). In addition, the sample for those SMSA's which are not 100 percent permit-issuing included a sample selected from a third frame—those units located in areas not under the jurisdiction of permit-issuing offices (the nonpermit universe). This SMSA is not 100 percent permit-issuing. A more detailed description of the selection of the sample can be found in the AHS Series H-170 reports for 1975.

ESTIMATION

The estimation procedure for the DOT Travel-to-Work Supplement utilized the AHS-SMSA housing inventory esti-

mation procedure modified for the DOT Supplement as described below.

AHS-SMSA Housing Inventory Estimation Procedure

Initially the basic weight (i.e., the inverse of the probability of selection) for each interviewed sample housing unit was adjusted to account for the noninterviews previously mentioned. The noninterview adjustment factor was equal to the following ratio:

$$\frac{\text{Weighted count of interviewed housing units} + \text{Weighted count of noninterviewed housing units}}{\text{Weighted count of interviewed housing units}}$$

Within each sector (central city and balance) of each SMSA, a noninterview factor was computed separately for 56 noninterview cells.

A ratio estimation procedure was then employed for all sample housing units from the permit-issuing universe. This factor was computed separately for all sample housing units within the 54 noninterview cells pertaining to the permit-issuing universe. The ratio estimate factor for each cell was equal to the following:

$$\frac{\text{1970 census count of housing units from permit-issuing universe in a cell}}{\text{AHS sample estimate of 1970 housing units from the cell}}$$

DOT Supplement Adjustments. For the DOT Supplement, the weight resulting from the AHS-SMSA estimation procedure described above was adjusted to account for persons in households that were interviewed for AHS-SMSA who did not respond to the travel-to-work section of the questionnaire. This noninterview adjustment factor was calculated separately for each sector of each SMSA. Within each sector of each SMSA, a noninterview factor was computed separately for sex, age, and marital status categories.

The final adjustment for persons interviewed for the DOT Supplement was an additional ratio estimation procedure. This procedure was designed to adjust the AHS-SMSA sample estimate of persons 14 years and older in each SMSA to an independently derived current estimate of that same population group. In SMSA's where there was no evidence of differential undercoverage of persons within the sectors, the sample estimate of persons 14+ in the SMSA was adjusted to an independently derived estimate of persons 14+ in the SMSA. For SMSA's where there was evidence of differential

undercoverage within the sector, this ratio estimation was performed separately by central city and balance of the SMSA. The factor used for the ratio estimation procedure was calculated as follows:

$$\frac{\text{Independent estimate of persons 14+ in the SMSA (or sector)}}{\text{Sample estimate of persons 14+ in the SMSA (or sector)}}$$

The numerator of this ratio was based on the Census Bureau's estimates of population 14+ as of October 1, 1975. The denominator of this ratio was obtained from the weighted estimate of persons interviewed for the DOT Supplement, using the existing weight after the DOT Supplement noninterview adjustment had been applied. For this SMSA, one person ratio estimate factor was calculated for the whole SMSA.

The weight that resulted from the application of this final adjustment was the tabulation weight utilized to produce final tabulations.

The effect of this person ratio estimation, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. Since the population 14 years and older of the sample differed somewhat by chance from the actual population in each city, SMSA balance, or SMSA as a whole, it can be expected that the sample estimates will be improved when the sample population is brought into agreement with known independent estimates of the actual population.

RELIABILITY OF THE DATA

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

Nonsampling Errors

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

The DOT Travel-to-Work Supplement. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

Coverage errors. With respect to errors of coverage and estimation for missing data, it is believed that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction and new mobile homes (and trailers) in permit-issuing areas. Although it is not known exactly, an estimated 5,100 conventional new construction units and 4,400 new mobile homes in permit-issuing areas in this SMSA were missed by the 1975 AHS-SMSA survey. It is felt that deficiencies also exist in non-permit-issuing areas. The 1975 AHS sample has been estimated to miss as much as 2 percent of all housing units in these areas.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators had no chance for enumeration in the DOT Travel-to-Work Supplement. The person ratio estimation corrects for these deficiencies with respect to the count of persons 14+ in each SMSA. However, biases associated with estimates of travel-to-work characteristics of these people may still remain.

Rounding errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages and medians derived from relatively large bases (e.g., median number of workers per household or median distance traveled to work).

This means that confidence intervals formed from the standard errors given may be distorted, and this should be taken into account when considering the results of the survey.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error as calculated for this survey also partially measures the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and

nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

For very small estimates the lower limit of the confidence interval may be negative. In this case, a better approximation to the true interval estimate can be achieved by restricting the interval estimate to positive values, that is, by changing the lower limit of the interval estimate to zero.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for this SMSA. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables A-1 and A-2 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1975-76 AHS-SMSA survey. Standard errors for estimates not shown in the tables can be obtained by linear interpolation. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These

estimates of standard errors are considered to be overestimates of the true standard errors.

Illustration of the Use of the Standard Error Tables

Table 3 of the report indicates that there were 175,000 female workers in this SMSA in 1975-76. Interpolation in table A-1 of the appendix shows that the standard error of an estimate of this size is approximately 3,680. Consequently, the 68-percent confidence interval, as shown by these data, is from 171,320 to 178,680. Therefore, a conclusion that the average estimate, derived from all possible samples, of female workers lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 169,110 to 180,890 workers with 90-percent confidence and within the interval from 167,640 to 182,360 with 95-percent confidence.

Table 3 also shows that of the 175,000 female workers, 12.7 percent commuted by means of public transportation. Interpolation in table A-2 of the appendix shows that the standard error of this percent is approximately 0.8 percentage points. Consequently, the 68-percent confidence interval, as shown by these data, is from 11.9 to 13.5 percent; the 90-percent confidence interval is from 11.4 to 14.0 percent; and the 95-percent confidence interval is from 11.1 to 14.3 percent.

Standard errors of differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. However, if there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error; whereas if there is a high negative correlation, the formula will underestimate the true standard error.

Illustration of the Computation of the Standard Error of a Difference

In 1975, 5.2 percent of the male workers in this SMSA commuted by means of public transportation. Thus, the apparent difference, as shown by these data, between the percentage of public transportation use by males and females is 7.5 percent. Table A-2 of the appendix shows the standard error of 5.2 percent on a base of 267,000 is approximately 0.4 percent, while the standard error of 12.7 percent is approximately 0.8 percent. Therefore, the standard error of the estimated difference of 7.5 percent is about

$$0.9 = \sqrt{(0.8)^2 + (0.4)^2}$$

Consequently, the 68-percent confidence interval for the 7.5 percent difference is from 6.6 to 8.4 percent. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 6.1 to 8.9 percent, and the 95-percent confidence interval is from 5.7 to 9.3 percent. Thus, we can conclude with 95-percent confidence that the percentage of female workers who used public transportation in 1975 is greater than the percentage of male workers who used transit, since the 95-percent confidence interval does not include zero or negative values.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure can be used to estimate the 68-percent confidence limits on sample data:

1. Determine, using the appropriate standard error table, the standard error of the estimate of 50 percent from the distribution.
2. Add to and subtract from 50 percent the standard error determined in step 1.
3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step 2.

A two-standard-error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1.

Illustration of the Computation of a Confidence Interval for a Median

Table 5 of this report indicates that the median travel time to work for commuters who drove alone in 1975-76 was 18.0 minutes.

1. Using table A-2 of the appendix, the standard error of 50 percent on a base of 255,000 is found to be about 1.0 percent.
2. A 95-percent confidence interval on a 50 percent item is obtained by adding to and subtracting from 50 percent twice the standard error found in step 1. This yields percent limits 48.0 and 52.0.
3. The median interval is 15 to 24 minutes (14.5 to 24.5). It can be seen that 37.1 percent of the persons fall in the intervals below the median interval, while 37.4 percent fall in the median interval itself. Thus, the lower limit of the estimate is found to be about

$$14.5 + (24.5 - 14.5) \left(\frac{48.0 - 37.1}{37.4} \right) = 17.4$$

Similarly, the upper limit is found by linear interpolation to be about

$$14.5 + (24.5 - 14.5) \left(\frac{52.0 - 37.1}{37.4} \right) = 18.5$$

Thus, the 95-percent confidence interval on the estimated median is from 17.4 to 18.5 minutes.

Standard error of an arithmetic mean. The standard error of an arithmetic mean can be approximated by the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{b}{y} S^2}$$

where y is the size of the base, and b is a parameter which equals 100.4 for this SMSA, 106.9 for the central city, and 100.7 for the balance.

The variance, S^2 , is given by

$$S^2 = \sum_{i=1}^c P_i \bar{X}_i^2 - \left(\sum_{i=1}^c P_i \bar{X}_i \right)^2$$

where c is the number of groups; i indicates a specific group, thus taking on values 1 through c ; P_i is the estimated proportion with the characteristic in group i ; Z_{i-1} and Z_i are the lower and upper interval boundaries, respectively, for group i ; and $\bar{X}_i = \frac{Z_{i-1} + Z_i}{2}$, which is assumed to be the most

representative value for the characteristic for persons in group i . Group c is open-ended, i.e., no upper interval boundary exists. For this group an approximate average value is

$$\bar{X}_c = \frac{3}{2} Z_{c-1}$$

Illustration of the Computation of the Standard Error of an Arithmetic Mean

Table 5 of the report shows that the mean travel time for persons driving alone in 1975-76 was 17.8 minutes. The values of P_i and \bar{X}_i for each group are shown below:

Class Interval	P_i	\bar{X}_i
Less than 10 min.	.180	4.5
10 to 14 min.	.191	12.0
15 to 24 min.	.374	19.5
25 to 29 min.	.063	27.0
30 to 34 min.	.117	32.0
35 to 49 min.	.062	42.0
50 to 59 min.	.003	54.5
60 min. or more	.010	90.0

The variance S^2 is equal to

$$S^2 = \sum_{i=1}^8 P_i \bar{X}_i^2 - \left(\sum_{i=1}^8 P_i \bar{X}_i \right)^2 = 157.8$$

The b parameter is equal to 100.4. Thus the standard error on 17.8 minutes, $\sigma_{\bar{x}}$, is calculated to be

$$\sigma_{\bar{x}} = \sqrt{\frac{100.4}{255,000} (157.8)} = 0.2 \text{ minutes.}$$

Consequently, the 68-percent confidence interval is estimated to be from 17.6 to 18.0 minutes, the 90-percent confidence interval is from 17.5 to 18.1 minutes, and the 95-percent confidence interval is from 17.4 to 18.2 minutes.

Table A-1. Standard Errors for Estimated Number of Workers in the Portland, Oreg.-Wash. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

(68 chances out of 100. For explanation of symbols, see text)

Size of estimate	Standard error			Size of estimate	Standard error		
	SMSA	In central city	Not in central city		SMSA	In central city	Not in central city
0.....	100	110	100	25,000.....	1,560	1,560	1,550
100.....	100	110	100	50,000.....	2,170	2,100	2,140
200.....	140	150	140	75,000.....	2,620	2,430	2,550
500.....	220	230	220	100,000.....	2,970	2,630	2,870
700.....	260	270	270	150,000.....	3,510	2,740	3,310
1,000.....	320	330	320	250,000.....	4,190	1,760	3,700
2,500.....	500	510	500	500,000.....	4,470	-	2,100
5,000.....	710	720	710	800,000.....	1,730	-	-
10,000.....	1,000	1,020	990				

Table A-2. Standard Errors for Estimated Percentage of Workers in the Portland, Oreg.-Wash. SMSA, in the Central City of the SMSA, and in the Balance of the SMSA

Base of percentage	Estimated percentage					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
100.....	50.1	50.1	50.1	50.1	50.1	50.1
200.....	33.4	33.4	33.4	33.4	33.4	35.4
500.....	16.7	16.7	16.7	16.7	19.4	22.4
700.....	12.5	12.5	12.5	12.5	16.4	18.9
1,000.....	9.1	9.1	9.1	9.5	13.7	15.8
2,500.....	3.9	3.9	4.4	6.0	8.7	10.0
5,000.....	2.0	2.0	3.1	4.3	6.1	7.1
10,000.....	1.0	1.0	2.2	3.0	4.3	5.0
25,000.....	0.4	0.6	1.4	1.9	2.7	3.2
50,000.....	0.2	0.4	1.0	1.3	1.9	2.2
75,000.....	0.13	0.4	0.8	1.1	1.6	1.8
100,000.....	0.10	0.3	0.7	1.0	1.4	1.6
150,000.....	0.07	0.3	0.6	0.8	1.1	1.3
250,000.....	0.04	0.2	0.4	0.6	0.9	1.0
500,000.....	0.02	0.14	0.3	0.4	0.6	0.7
800,000.....	0.01	0.11	0.2	0.3	0.5	0.6

Appendix B—Facsimile of the Travel-to-Work Supplement

Line number of person	(240)	Line number of respondent	(241)	If last worker in this household, mark this box <input type="checkbox"/>
7a. What is . . . 's principal means of transportation to work? <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>(242) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } →</p> <p>(243) 1 <input type="checkbox"/> Drives alone – Skip to 8a 2 <input type="checkbox"/> Shares driving } 3 <input type="checkbox"/> Drives others } Skip to 7c 4 <input type="checkbox"/> Rides with someone else } 5 <input type="checkbox"/> Walks only – Skip to 8a 6 <input type="checkbox"/> Works at home – Skip to 12a 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means – Specify _____</p> </div> <div style="width: 5%; text-align: center;"> <p>→</p> </div> </div>				8d. Was . . . 's place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 8c(4))? (248) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Don't know
b. Does . . . usually ALSO use a car for part of the trip to work? (244) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No – Skip to 8a				9. What time does . . . usually leave for work? (249) _____ Time (250) 1 <input type="checkbox"/> a.m. 2 <input type="checkbox"/> p.m.
c. How many people, including . . . , usually ride in the car to work? (245) _____ Number				10. How long does it usually take . . . to get from home to work? (251) _____ Minutes
8a. Does . . . usually WORK at the same location each day? (246) 1 <input type="checkbox"/> Yes – Skip to 8c 2 <input type="checkbox"/> No				11. What is . . . 's ONE-WAY distance from home to work? (252) _____ Miles OR 0 <input type="checkbox"/> Less than 1 mile
b. Does . . . usually REPORT to the same location to begin work each day? (247) 3 <input type="checkbox"/> Yes 4 <input type="checkbox"/> No – Skip to 12a				12a. In the last year, has . . . changed his principal means of transportation to work? (253) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No – Skip to 13
c. Where is . . . 's usual place of work? (1) Company or business establishment name <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div>				b. What was . . . 's principal means of transportation to work (prior to the change)? (254) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } → (255) 1 <input type="checkbox"/> Drove alone 2 <input type="checkbox"/> Shared driving 3 <input type="checkbox"/> Drove others 4 <input type="checkbox"/> Rode with someone else 5 <input type="checkbox"/> Walked only 6 <input type="checkbox"/> Worked at home 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means – Specify _____
(2) Address (Number and street) Note – If address (number and street name) are not known, enter building name, shopping center name, or other physical location description. <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div>				13. If "Yes" marked in 12a – ASK Compared to . . . 's previous means of transportation to work (Given in 12b), how satisfied is . . . with his present means of transportation to work – much more, more, about the same, less or much less satisfied? (256) 1 <input type="checkbox"/> Much more satisfied 2 <input type="checkbox"/> More satisfied 3 <input type="checkbox"/> About the same satisfaction 4 <input type="checkbox"/> Less satisfied 5 <input type="checkbox"/> Much less satisfied 6 <input type="checkbox"/> Don't know 7 <input type="checkbox"/> Did not work last year
(3) Names of nearest intersecting streets <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div>				If "No" marked in 12a – ASK Compared to a year ago, how satisfied is . . . now with his principal means of transportation to work – much more, more, about the same, less or much less satisfied? <div style="text-align: center;"> <p>←</p> </div>
(4) Name of city, town, village, borough, etc. <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div>				
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> (5) County <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> </div> <div style="width: 5%; text-align: center;"> <p>Place type →</p> </div> <div style="width: 50%;"></div> </div>				
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> State ZIP code <div style="border-bottom: 1px solid black; height: 1.2em; width: 100%;"></div> </div> <div style="width: 55%;"></div> </div>				INTERVIEWER
<div style="border: 1px solid black; padding: 5px;"> Be sure to transcribe items 6c, 7a, 7b, 10 and 11 for head of household to items 82a–e on page 19 of AHS-52 questionnaire. </div>				

Appendix C—Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix B.) An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. This is the actual geographic location at which the worker *usually* carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time and then changed work locations (e.g., a temporary office worker) were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported to begin work each day. Persons who neither worked at the same location nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation or inquiry of the enumerator.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Head of household. In the 1975-76 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. A married woman was not classified as the head of household if her husband was living with her at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

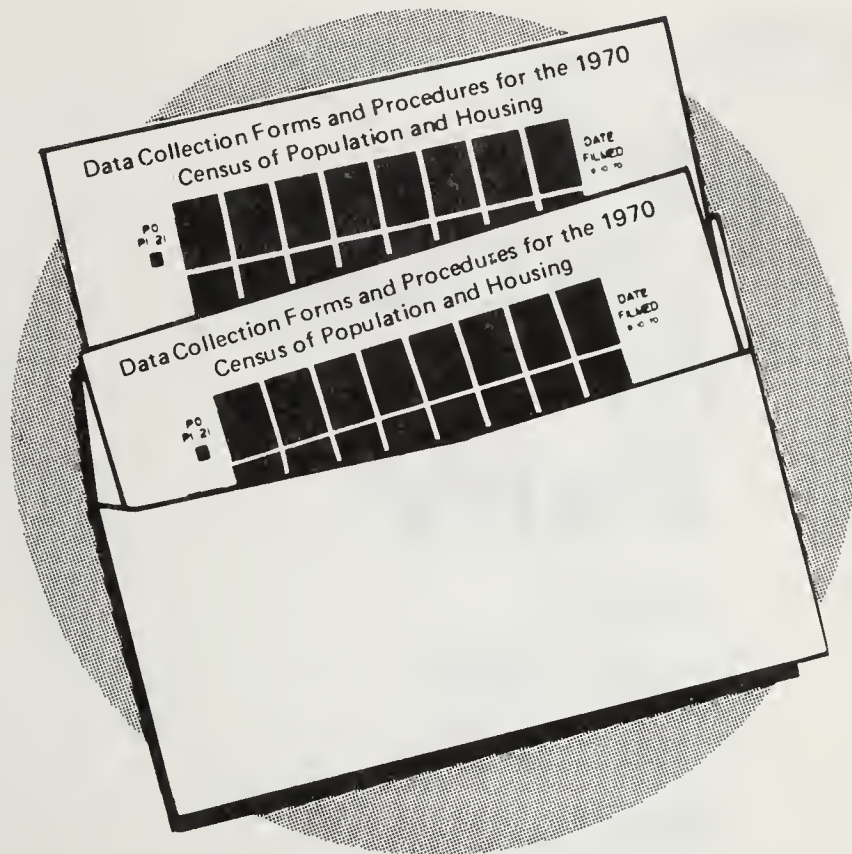
Earnings. Earnings are the total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "--" means "rounds to or represents zero." Three dots "..." means "not applicable."

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BUREAU OF
THE CENSUS

the Journey to Work

**in the
UNITED
STATES:
1975**



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Issued July 1979

the Journey to Work

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ACKNOWLEDGMENTS

This report was prepared by Philip N. Fulton, Chief of the Journey-to-Work Statistics Staff. Professional assistance was provided by Phillip A. Salopek, and statistical assistance was provided by Gloria Swieczkowski and Dorella Jones. Computer programming and processing were performed by Thomas Meerholz, Demographic Surveys Division, under the supervision of D. Richard Bartlett. The section on the source and reliability of the data was prepared by Austin Lin and sampling review was conducted by Mason Malmuth, both under the direction of Donald Luery and Dennis Schwanz, Statistical Methods Division. Publication preparation within Population Division was performed under the direction of Vivian Brown. In the Publication Services Division, the text and tables were edited by Paula Coupe and graphics assistance was provided by Beverly Jaquish. Overall direction was provided by Charles E. Johnson, Jr., Assistant Chief (Demographic and Social Statistics Programs), Population Division.

Library of Congress Cataloging in Publication Data

United States. Bureau of the Census.
The journey to work in the United States,
1975.

(Current population reports : Special studies :
Series P-23 ; no. 99)

1. Commuting—United States—Statistics.
I. Title. II. Series: United States. Bureau
of the Census. Current population reports :
Special studies : Series P-23 ; no. 99.

HA203.A218 no. 99 [HD5723] 312'.0973s [388.4'1]
79-9520

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by a draft on a U.S. bank. **Current Population Reports** are sold in two subscription packages: Series P-20, P-23, P-27, and P-60 are available for \$40.00 per year (\$10 additional for foreign mailing); Series P-25, P-26, and P-28 are available for \$70.00 per year (\$17.50 additional for foreign mailing). The single-copy price of this report is \$1.75.

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SYMBOLS USED IN TABLES

- Represents zero.
- ... Not applicable.

The Journey to Work in the United States: 1975

INTRODUCTION

This report is one of a series of publications from the Travel-to-Work Supplement to the Census Bureau's Annual Housing Survey (AHS), initiated in 1975 under the sponsorship of the U.S. Department of Transportation. The AHS is conducted for the U.S. Department of Housing and Urban Development. The report is a special study of commuting in the United States, based on interviews of households from the AHS national sample, completed during the period of October through December 1975.

HIGHLIGHTS

- Workers who both lived and worked in the suburbs made up the largest group of commuters within metropolitan areas in 1975. Such workers numbered about 19,300,000 compared to the 9,600,000 persons who commuted from the suburbs into central cities to work.
- Metropolitan areas attracted 2 million workers from nonmetropolitan areas, about twice the approximately 1 million workers who lived in metropolitan areas but worked at nonmetropolitan jobs.
- About 6,700,000 workers, 8 percent of all workers in the United States, regularly worked at different locations and had no fixed place of work.
- The proportion of both central city and suburban residents who worked in the suburbs increased between 1970 and 1975, while the proportion working in central cities declined during the same period for both groups.
- About 65 percent of all workers in the United States drove to work alone in an automobile or truck in 1975. About 19 percent were in carpools, 6 percent used public transportation, and the rest walked, worked at home, or used some other means of transportation.
- Workers who lived and worked within a central city had the highest rate of public transportation use, about 16 percent, among workers in major commuting flows.
- Workers who lived in the suburbs, regardless of their work-trip destination, were more likely to drive alone than other workers. Two-thirds or more of those persons living in the suburbs and working in central cities, suburbs, or in nonmetropolitan territory drove to work alone.
- Workers living in nonmetropolitan territory and working in central cities or suburbs demonstrated especially high rates of carpooling compared with the Nation as a whole.

- The use of public transportation for commuting to work among workers using vehicles declined by about 3 percentage points, from 10 percent to 7 percent, between 1970 and 1975.
- The average commuting trip in the United States was about 9 miles in 1975. Workers who drove alone traveled an average of 8 miles to work, compared with 11 miles for workers in carpools. Public transportation users averaged 9 miles to work.
- The average work trip took about 20 minutes from home to work. Workers who drove alone took an average of 18 minutes to get to work, compared with 23 minutes for workers in carpools. Public transportation users spent an average of 40 minutes getting to work.

COMMUTING PATTERNS IN THE UNITED STATES

Major U.S. commuting flows. Tables A and B present the daily volume of worker travel in major U.S. commuting flows in 1975 and the percentage distribution of workers by place of residence among places of work.

Contrary to the common notion of commuters pouring out of suburban residential areas each day onto jammed streets and expressways enroute to downtown workplaces, workers who both lived and worked in the suburbs actually made up the largest group of commuters within U.S. standard metropolitan statistical areas (SMSA's) in 1975. Such workers numbered approximately 19,300,000, about twice the 9,600,000 persons who traveled from the suburbs into central cities to work. Most workers who lived in central cities worked in central cities (79 percent of all workers residing in central cities), although about 4 million workers living in central cities (19 percent) traveled out to suburban jobs.

Metropolitan areas attracted twice as many commuters from nonmetropolitan territory as the reverse in 1975. About 2,100,000 workers living in nonmetropolitan territory (9 percent) worked in a metropolitan area, while about 1 million workers living in metropolitan areas (2 percent) were working at nonmetropolitan jobs.

Commuters with no fixed place of work. The survey results also provide an indication for the first time of the number of people such as traveling salesmen, construction workers, or laborers who have no fixed place of work. The data show that in 1975, about 6,700,000 employed persons, 8 percent of all workers in the United States, neither worked at the same location each day, nor regularly reported to one central location before traveling to their work site.

Net commuter movement. Table C provides a summary comparison of the daily net gain or loss of workers for each geographic area, and the worker/resident ratio for each sector—the ratio of persons working in the area to the number of workers who live in the area. Ratios over 1.00

result when the amount of employment within a sector is greater than its resident labor force, and ratios under 1.00 result when the sector's resident labor force is larger than the number of jobs available there. The table shows that despite the fact that suburb-to-suburb commuters made up the

Table A. Place of Residence by Place of Work

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Total	Inside SMSA's			In nonmetro- politan area		
			Total	Inside central cities	Outside central cities			
All workers.....	80,125	72,733	51,507	27,116	24,391	21,226	6,724	668
Inside SMSA's.....	55,418	50,425	49,420	26,119	23,301	1,005	4,512	481
Inside central cities..	22,760	20,846	20,568	16,528	4,040	278	1,700	214
Outside central cities..	32,658	29,579	28,852	9,592	19,261	727	2,811	267
In nonmetropolitan area..	24,707	22,308	2,087	997	1,090	20,221	2,212	187

Table B. Place of Residence by Percentage Distribution in Places of Work

(For the United States: 1975. Workers 14 years old and over. SMSA's as of the 1970 census)

Place of residence	All workers	Reported a fixed place of work					No fixed place of work	Place of work not reported
		Inside SMSA's				In nonmetro- politan area		
		Total	Total	Inside central cities	Outside central cities			
All workers.....	[100.0]	100.0	70.8	37.3	33.5	29.2	[8.4]	[0.8]
Inside SMSA's.....	[100.0]	100.0	98.0	51.8	46.2	2.0	[8.1]	[0.9]
Inside central cities..	[100.0]	100.0	98.7	79.3	19.4	1.3	[7.5]	[0.9]
Outside central cities..	[100.0]	100.0	97.5	32.4	65.1	2.5	[8.6]	[0.8]
In nonmetropolitan area..	[100.0]	100.0	9.4	4.5	4.9	90.6	[9.0]	[0.8]

Note: Percents in brackets [] are of all workers.

Source: Table A.

Table C. Net Commuter Movement Between Geographic Areas

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census)

Geographic area	Workers living in area who reported a fixed place of work	Workers working in area	Worker/resident ratio	Total in-commuters	Total out-commuters	Net commuting
SMSA's.....	50,425	51,507	1.02	2,087	1,005	1,082
Inside central cities..	20,846	27,116	1.30	10,589	4,318	6,271
Outside central cities..	29,579	24,391	0.82	5,130	10,319	-5,189
Nonmetropolitan areas....	22,308	21,226	0.95	1,005	2,087	-1,082

Source: Table A.

largest major commuting flow within metropolitan areas in 1975, central cities were primarily employment areas and suburbs were primarily residential areas. Central cities had a worker/resident ratio of 1.30 in 1975, resulting from a daily net gain of nearly 6,300,000 commuters. In contrast, suburban areas exhibited a worker/resident ratio of .82, reflecting their daily net loss of about 5,200,000 commuters.

Changes in major U.S. commuting flows: 1970 to 1975. Comparing the results of the survey with the 1970 census, the data show that although central cities were still the primary location of jobs in 1975, the trend between 1970 and 1975 was toward the growing incidence of suburban employment (table D). The proportion of persons working in the suburbs increased for both central city residents (3

Table D. Place of Residence by Place of Work: 1975 and 1970

(For the United States. Number of workers in thousands. 1975 data pertain to workers 14 years old and over. 1970 data pertain to workers 16 years old and over. SMSA's as of the 1970 census. For explanation of symbols, see text)

Years	Living in SMSA central cities					
	Number		Percent of reported workers working --			
	Total	Reported place of work	In SMSA of residence		In another SMSA	In nonmetropolitan area
			Inside central cities	Outside central cities		
1975 travel-to-work survey.....	22,760	20,846	78.4	17.9	2.4	1.3
1970 census.....	24,155	22,133	80.7	15.2	3.1	1.0
Percentage point change, 1970-75 ¹..	...	...	-2.3	2.7	-0.7	0.3
	Living in SMSA's, outside central cities					
	Number		Percent of reported workers working --			
	Total	Reported place of work	In SMSA of residence		In another SMSA	In nonmetropolitan area
			Inside central cities	Outside central cities		
1975 travel-to-work survey.....	32,658	29,579	30.2	60.9	6.5	2.5
1970 census.....	27,839	26,216	32.8	59.4	6.0	1.8
Percentage point change, 1970-75 ¹..	...	...	-2.6	1.5	0.5	0.7
	Living in nonmetropolitan area					
	Number		Percent of reported workers working --			
	Total	Reported place of work	In SMSA's		In nonmetropolitan area	
			Inside central cities	Outside central cities		
1975 travel-to-work survey.....	24,707	22,308	4.5	4.9	90.6	
1970 census.....	21,723	20,017	4.4	4.1	91.5	
Percentage point change, 1970-75 ¹..	...	...	0.1	0.8	-0.9	

¹For limitations on comparison between the survey data and census data, see text.

percentage points) and suburban residents (2 percentage points) during the period, while the proportion of persons working in central cities declined at about the same rate for both groups (2 percentage points for central city residents and 3 percentage points for workers living in suburban areas).

MEANS OF TRANSPORTATION TO WORK

Principal means of transportation. Nearly 85 percent of all workers in the United States traveled to work in an automobile or truck in 1975 (table E). About 65 percent drove alone and 19 percent were members of carpools. Another 6 percent used public transportation to get to work, 5 percent walked to work, and 3 percent worked at home. Bicycle and motorcycle riders combined accounted for about 1 percent of all commuters.

Table E. Principal Means of Transportation to Work

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands)

Means of transportation	Number	Percent
All workers.....	80,125	100.0
Automobile or truck.....	67,869	84.7
Drive alone.....	52,294	65.3
Automobile.....	44,830	56.0
Truck.....	7,464	9.3
Carpool.....	15,575	19.4
Automobile.....	13,828	17.3
Truck.....	1,747	2.2
Public transportation.....	4,825	6.0
Bus or streetcar.....	3,100	3.9
Subway or elevated.....	1,179	1.5
Railroad.....	405	0.5
Taxicab.....	141	0.2
Bicycle.....	471	0.6
Motorcycle.....	297	0.4
Walk only.....	3,778	4.7
Other means.....	299	0.4
Work at home.....	2,585	3.2

Means of transportation used by workers in major commuting flows. More than one-half of the workers living in each geographic sector—central cities, suburbs, and nonmetropolitan areas—drove alone to work in 1975 (table F). Workers living in the suburbs were most likely to drive alone (70 percent), while workers living in nonmetropolitan areas had the highest rate of carpooling (22 percent), and workers living in central cities exhibited the highest rate of public transportation use (14 percent). However, considerable variation in this pattern is evidenced when the type of commuting trip is taken into account.

Workers who lived and worked within the same central city, work trips for which public transportation is most likely available and accessible, demonstrated the highest rate of transit use (16 percent) among workers in the various

commuting flows and comparatively low rates of commuting by automobile or truck. In contrast, central city residents who worked in the suburbs or nonmetropolitan areas had much lower rates of public transportation use and a significantly higher incidence of commuting by automobile or truck. This differential presumably results, in large part, from the orientation of public transportation service toward getting people to work on heavily traveled intracity and suburb-to-city routes rather than on less traveled routes out of central cities. Workers residing in central cities and working at nonmetropolitan jobs were also more likely to be members of carpools than those who worked within the metropolitan area.

Workers who lived in the suburbs in 1975, regardless of their work-trip destination, were more likely to drive alone than workers in most flows originating either in central cities or nonmetropolitan areas. About two-thirds or more of those living in the suburbs and working in central cities, suburban areas, or in nonmetropolitan territory drove alone to work. Workers who commuted into the central city of their metropolitan area were more likely to take public transportation to work (10 percent) than suburban residents who worked in the suburbs or in nonmetropolitan areas. Among those workers living and working in suburban areas, the largest group of metropolitan commuters, only 2 percent used public transportation to get to work. Such a low percentage may reflect the difficulty of public transportation to efficiently serve the complex commuting trips which result from low density residential and employment patterns in suburban areas.

Although the rate of carpooling among workers living and working in nonmetropolitan areas (21 percent) was about the same as that of all workers in the United States, the rates for commuters who resided in nonmetropolitan areas but worked in central cities or the suburbs of metropolitan areas were considerably higher (39 percent and 37 percent, respectively). The high rates for these groups may be an indication of the effect of workers who have moved from metropolitan to nonmetropolitan areas, retained their jobs in the metropolitan areas, and compensated for the more difficult trip by joining carpools. Workers living in nonmetropolitan territory were the most likely to be working at home, the large majority presumably on farms.

Viewing the use of major transportation modes from a different perspective, the survey results show the degree to which the use of public transportation for commuting to work was concentrated within central cities in 1975, compared to the use of private vehicles. Table G shows that 59 percent of all workers using public transportation lived and worked within central cities, while 55 percent of all workers in carpools and 57 percent of all workers who drove alone both lived and worked outside central cities, either in the suburbs or in nonmetropolitan territory.

Recent changes in means of transportation to work. Most workers surveyed had not altered their principal means of commuting to work in the 12 months prior to enumeration. However, among the workers who did change transportation

Table F. Place of Residence by Place of Work, by Means of Transportation to Work

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census. For explanation of symbols, see text)

Place of residence by place of work	Total	Automobile or truck			Public transportation	Other means ¹	Worked at home
		Total	Drive alone	Carpool			
NUMBER							
All workers.....	80,125	67,869	52,294	15,575	4,825	4,845	2,585
Living in SMSA central cities ²	22,760	17,558	13,622	3,935	3,188	1,645	370
Working in central city of same SMSA.....	16,338	11,823	9,152	2,671	2,674	1,472	370
Working in same SMSA, outside central cities.....	3,724	3,464	2,684	780	209	51	-
Working in another SMSA.....	506	439	316	123	54	13	-
Working in nonmetropolitan area..	278	254	170	84	10	14	-
Living in SMSA's, outside central cities ²	32,658	28,940	22,756	6,185	1,437	1,571	709
Working in central city of same SMSA.....	8,932	7,972	5,965	2,007	862	97	-
Working in same SMSA, outside central cities.....	18,001	15,720	12,523	3,197	318	1,254	709
Working in another SMSA.....	1,919	1,682	1,266	416	185	53	-
Working in nonmetropolitan area..	727	672	495	177	5	49	-
Living in nonmetropolitan area ²	24,707	21,371	15,916	5,455	201	1,628	1,506
Working in central cities.....	997	944	559	385	37	16	-
Working in SMSA's, outside central cities.....	1,090	1,059	659	400	10	22	-
Working in nonmetropolitan area..	20,221	17,083	12,928	4,155	140	1,491	1,506
PERCENTAGE DISTRIBUTION							
All workers.....	100.0	84.7	65.3	19.4	6.0	6.0	3.2
Living in SMSA central cities ²	100.0	77.1	59.9	17.3	14.0	7.2	1.6
Working in central city of same SMSA.....	100.0	72.4	56.0	16.3	16.4	9.0	2.3
Working in same SMSA, outside central cities.....	100.0	93.0	72.1	20.9	5.6	1.4	-
Working in another SMSA.....	100.0	86.8	62.5	24.3	10.7	2.6	-
Working in nonmetropolitan area..	100.0	91.4	61.2	30.2	3.6	5.0	-
Living in SMSA's, outside central cities ²	100.0	88.6	69.7	18.9	4.4	4.8	2.2
Working in central city of same SMSA.....	100.0	89.3	66.8	22.5	9.7	1.1	-
Working in same SMSA, outside central cities.....	100.0	87.3	69.6	17.8	1.8	7.0	3.9
Working in another SMSA.....	100.0	87.6	66.0	21.7	9.6	2.8	-
Working in nonmetropolitan area..	100.0	92.4	68.1	24.3	0.7	6.7	-
Living in nonmetropolitan area ²	100.0	86.5	64.4	22.1	0.8	6.6	6.1
Working in central cities.....	100.0	94.7	56.1	38.6	3.7	1.6	-
Working in SMSA's, outside central cities.....	100.0	97.2	60.5	36.7	0.9	2.0	-
Working in nonmetropolitan area..	100.0	84.5	63.9	20.5	0.7	7.4	7.4

¹Includes workers using bicycles, motorcycles, walking to work, and workers using other means not shown separately.

²Includes workers with no fixed place of work and workers who did not report a place of work not shown separately.

Table G. Workers Using Selected Means of Transportation to Work, by Percentage Distribution in Major Commuter Flows

(For the United States: 1975. Workers 14 years old and over. SMSA's as of the 1970 census)

Commuter flows	Auto or truck		Public transportation
	Drive alone	Carpool	
All workers ¹ (thousands).....	46,718	14,395	4,505
Percent.....	100.0	100.0	100.0
Living in SMSA central cities:			
Working in central city of same SMSA.....	19.6	18.6	59.4
Working in same SMSA, outside central cities.	5.7	5.4	4.6
Working in another SMSA.....	0.7	0.9	1.2
Working in nonmetropolitan area.....	0.4	0.6	0.2
Living in SMSA's, outside central cities:			
Working in central city of same SMSA.....	12.8	13.9	19.1
Working in same SMSA, outside central cities.	26.8	22.2	7.1
Working in another SMSA.....	2.7	2.9	4.1
Working in nonmetropolitan area.....	1.1	1.2	0.1
Living in nonmetropolitan area:			
Working in central cities.....	1.2	2.7	0.8
Working in SMSA's, outside central cities....	1.4	2.8	0.2
Working in nonmetropolitan area.....	27.7	28.9	3.1

¹Workers who reported a fixed place of work.

modes during the period, the survey results are indicative of the type of changes that were occurring between the fall of 1974—about 6 months after the end of the Organization of Petroleum Exporting Countries oil embargo—and the fall of 1975 1 year later.

Table H shows that 99 percent of the workers who had used an automobile or truck and 88 percent of those who had used public transportation to get to work in 1974 were still using the same mode in 1975. Workers who had been using public transportation in 1974 were more likely to be using an automobile or truck in 1975 than the reverse; 10 percent of those riding public transportation in 1974 were using an automobile or truck to get to work in 1975, whereas less than 1 percent of the workers who used an automobile or truck in 1974 were using public transportation in 1975.

Among automobile and truck users, the rate of change from carpooling to driving alone was greater than that in the opposite direction; 5 percent of the workers who had previously been in carpools had changed to driving alone, while 2 percent of those who had driven alone were in carpools 1 year later. Among workers who had been using other means in 1974, 10 percent were using an automobile or truck in 1975, and about 1 percent had changed to public transportation.

Changes in the use of public transportation: 1970 to 1975. Detailed comparison of the survey data with 1970 census data is limited by the lack of comparability between several of the means of transportation categories used in the two enumerations. However, since the public transportation

categories (i.e., bus or streetcar, subway or elevated, railroad, and taxicab) are the same for both time periods, it is possible to assess the changes in public transportation use for home-to-work travel that have occurred in the United States between 1970 and 1975.

The survey results indicate that the use of public transportation decreased by 3 percentage points, from 10 percent to 7 percent, between 1970 and 1975 among all vehicle users (table I). Most of this decline was attributable to workers living in central cities where the proportionate use of transit for commuting to work decreased 7 percentage points, from 22 percent to 15 percent. Public transportation use among workers living and working in the same central city declined by 6 percentage points and among workers living in central cities and working in the suburbs of their metropolitan area by 4 percentage points between 1970 and 1975.

TRAVEL DISTANCE AND TRAVEL TIME TO WORK

Travel distance by means of transportation to work. The average commuting trip from home to work in the United States was 9 miles in 1975 (table J). Workers who drove alone traveled an average of 8 miles to work, compared with 11 miles for workers in carpools. Public transportation users averaged 9 miles to work, but there was considerable variation among the transit modes. Workers riding a bus or streetcar averaged 7 miles from home to work while those commuting by railroad averaged 24 miles. It should be noted that data on trip length for public transportation riders must

Table H. Means of Transportation Last Year, by Percent Using Current Means

(For the United States: 1975. Workers 14 years old and over)

Means of transportation last year (1974)	Current means of transportation (1975)						
	All workers ¹ (thousands)	Total (percent)	Automobile or truck			Public transportation	Other means ³
			Total	Drive alone	Carpool		
All workers reporting means used last year..	79,342	100.0	84.9	65.4	19.4	5.9	9.2
Automobile or truck ²	67,111	100.0	98.5	76.2	22.3	0.5	1.0
Drive alone.....	50,828	100.0	98.7	97.2	1.6	0.4	0.9
Carpool.....	14,888	100.0	98.2	4.5	93.7	0.8	1.0
Public transportation.....	4,854	100.0	10.4	6.1	4.2	88.3	1.3
Other means ³	7,377	100.0	9.7	6.8	2.9	0.8	89.4

¹All workers who reported current means of transportation.²Includes a small number of workers using an automobile or truck but not specifying type of riding arrangement.³Includes workers using bicycles or motorcycles, workers who walked to work or worked at home, and workers using other means not listed.

Table I. Change in Commuter Use of Public Transportation: 1970 and 1975

(For the United States. Number of workers in thousands. 1975 data pertain to workers 14 years old and over. 1970 data pertain to workers 16 years old and over. SMSA's as of the 1970 census. For explanation of symbols, see text)

Place of residence by place of work	1975			1970			Percentage point change in public transportation use, 1970-75 ¹
	Vehicle users			Vehicle users			
	Total	Using public transportation		Total	Using public transportation		
		Total	Percent		Total	Percent	
All workers.....	73,762	4,825	6.5	66,529	6,662	10.0	-3.5
Living in SMSA central cities ² ...	21,034	3,188	15.2	22,052	4,850	22.0	-6.8
Working in central city of same SMSA.....	14,704	2,674	18.2	16,093	3,872	24.1	-5.9
Working in same SMSA, outside central cities.....	3,700	209	5.6	3,296	312	9.5	-3.9
Working in another SMSA.....	498	54	10.8	655	121	18.5	-7.7
Working in nonmetropolitan area	267	10	3.7	200	10	5.0	-1.3
Living in SMSA's, outside central cities ²	30,823	1,437	4.7	25,899	1,506	5.8	-1.1
Working in central city of same SMSA.....	8,909	862	9.7	8,485	824	9.7	
Working in same SMSA, outside central cities.....	16,315	318	1.9	13,923	405	2.9	-1.0
Working in another SMSA.....	1,892	185	9.8	1,543	162	10.5	-0.7
Working in nonmetropolitan area	687	5	0.7	465	6	1.3	-0.6
Living in nonmetropolitan area ² ..	21,904	201	0.9	18,578	306	1.6	-0.7
Working in central cities.....	987	37	3.7	861	50	5.8	-2.1
Working in SMSA's, outside central cities.....	1,079	10	0.9	810	14	1.7	-0.8
Working in nonmetropolitan area	17,493	140	0.8	15,448	211	1.4	-0.6

¹For limitations on comparison of survey data with census data, see text.²Includes workers with no fixed place of work and workers who did not report a place of work not shown separately.

Table J. Means of Transportation by Distance to Work

(For the United States: 1975. Workers 14 years old and over. For explanation of symbols, see text)

Means of transportation to work	Total ¹ (thousands)	Percentage distribution by distance to work (miles)								Mean
		Total	Less than 1 mile	1 to 2 miles	3 to 4 miles	5 to 9 miles	10 to 14 miles	15 to 24 miles	25 miles or more	
All workers ¹	70,816	100.0	12.3	16.0	17.2	21.6	13.5	12.3	7.1	8.5
Automobile or truck.....	61,657	100.0	8.1	16.3	17.9	22.9	14.1	13.1	7.6	9.0
Drive alone.....	47,188	100.0	8.7	16.9	18.8	23.5	13.8	12.1	6.0	8.3
Carpool.....	14,470	100.0	6.0	14.4	15.0	20.7	15.0	16.0	12.8	11.4
Public transportation....	4,587	100.0	2.8	14.3	21.3	24.1	16.9	13.5	7.0	9.1
Bus or streetcar.....	2,958	100.0	3.1	18.0	26.1	25.7	15.2	8.7	3.3	7.1
Subway or elevated.....	1,124	100.0	1.3	5.6	15.8	28.2	26.0	18.7	4.2	10.1
Railroad.....	387	100.0	-	2.1	0.8	3.9	8.3	39.8	45.7	24.3
Taxicab.....	118	100.0	18.6	45.8	22.0	11.0	3.4	-	-	2.4
Bicycle.....	432	100.0	41.4	43.1	10.0	4.2	1.6	-	-	1.4
Motorcycle.....	285	100.0	11.2	19.3	17.2	19.3	15.8	12.6	4.6	7.5
Walk only.....	3,645	100.0	91.4	8.3	0.2	0.1	-	-	-	0.1
Other means.....	210	100.0	27.1	31.4	8.1	19.0	10.0	3.8	-	3.9

¹Excludes workers with no fixed place of work and workers who worked at home.

be interpreted with caution since such workers often do not have precise knowledge of the odometer distance of the trip.

Average travel distance in major commuting flows. Suburban residents generally traveled farther to work than did central city residents (table K). Workers who lived in suburban areas went 10 miles to work, on the average, compared with 7 miles for workers who lived in central cities. Workers who both lived and worked in a central city had an average commuting distance of 6 miles, in contrast to 8 miles for workers who lived and worked in the suburbs. Similarly, workers who journeyed out from central cities to suburban jobs averaged about 10 miles, while those commuting into cities from the suburbs averaged 12 miles in their work trip.

As could be expected, due to the relative distance between the geographic sectors, workers living in central cities and working in nonmetropolitan areas had an average commuting trip of 23 miles, and workers who lived in the suburbs and worked in nonmetropolitan areas had an average trip of 18 miles. Persons living and working in nonmetropolitan areas traveled 7 miles to work on the average. However, those commuting from nonmetropolitan areas to central cities and suburbs averaged 30 and 25 miles, respectively.

Travel time by means of transportation to work. The average commuting trip from home to work in the United States took 20 minutes in 1975 (table L). Workers who drove alone

took an average of 18 minutes to get to work, compared with 23 minutes for workers in carpools. Public transportation users spent an average of 40 minutes getting to work with the variation in average travel times among transit modes (35 minutes for bus or streetcar riders versus 62 minutes for workers who used the railroad) accounted for by differences in average travel distances.

Average travel time in major commuting flows. Despite the fact that suburban residents generally traveled farther to work than did central city residents, the average travel time for the groups was about the same. Workers living in suburban areas took an average of 22 minutes to get to work, compared with 21 minutes for central city residents (table M). This may be attributed to the greater incidence of automobile and truck use, especially that of workers driving alone, among workers who lived in the suburbs.

Although workers who lived and worked within a central city traveled a shorter distance to work, on the average, than workers who lived and worked within the suburbs, the commuting trip of the former group generally took longer than that of the latter group. Workers living and working in a central city took an average of 20 minutes getting to work compared with 17 minutes for workers who lived and worked in the suburbs. Consistent with their differential average commuting distance, workers who traveled into the central city from the suburbs took longer to get to work (27

Table K. Place of Residence by Place of Work, by Means of Transportation and Average
(Mean) Distance to Work

(For the United States: 1975. Workers 14 years old and over. SMSA's as of the 1970 census)

Means of transportation by average (mean) distance to work (miles)	Living in SMSA central cities				
	Total ¹	Working --			
		In SMSA of residence		In another SMSA	In non- metropolitan area
		Inside central cities	Outside central cities		
All workers ²	7.3	5.8	10.3	20.8	23.4
Drive alone.....	7.1	5.5	9.9	20.9	20.9
Carpool.....	8.5	6.1	11.9	23.1	29.2
Public transportation.....	7.2	6.8	8.0	16.3	21.7
Other means ³	4.0	3.3	6.5	11.6	8.0
Living in SMSA's, outside central cities					
	Total ¹	Working --			
		In SMSA of residence		In another SMSA	In non- metropolitan area
		Inside central cities	Outside central cities		
All workers ²	9.9	11.9	7.5	19.2	18.1
Drive alone.....	9.4	11.3	7.3	18.1	17.0
Carpool.....	11.6	13.1	8.9	21.0	21.9
Public transportation.....	13.0	13.8	3.6	23.5	14.6
Other means ³	4.4	7.6	2.9	10.0	11.4
Living in nonmetropolitan area					
	Total ¹	Working --			
		In SMSA's		In non- metropolitan area	
		Inside central cities	Outside central cities		
All workers ²	9.2	30.1	25.3	7.0	
Drive alone.....	7.9	28.2	22.6	6.3	
Carpool.....	13.3	32.9	30.2	9.9	
Public transportation.....	10.9	32.7	18.5	4.8	
Other means ³	2.9	9.7	8.0	2.5	

¹Includes workers with place of work not reported not shown separately.

²Excludes workers with no fixed place of work, and workers who walked to work or worked at home.

³Includes workers using bicycles, motorcycles, and all other means not listed.

Source: Table 1.

Table L. Means of Transportation by Travel Time to Work

(For the United States: 1975. Workers 14 years old and over. For explanation of symbols, see text)

Means of transportation to work	Total ¹ (thousands)	Percentage distribution by travel time (minutes)								Mean
		Total	Less than 10 minutes	10 to 14 minutes	15 to 24 minutes	25 to 29 minutes	30 to 34 minutes	35 to 49 minutes	50 minutes or more	
All workers ¹	70,816	100.0	21.5	18.2	30.5	4.6	11.6	8.4	5.3	19.9
Automobile or truck.....	61,657	100.0	20.5	19.0	32.3	4.9	11.6	7.8	3.9	19.1
Drive alone.....	47,188	100.0	22.3	19.9	32.8	4.8	10.7	6.6	2.8	17.8
Carpool.....	14,470	100.0	14.5	16.2	30.5	5.3	14.6	11.6	7.2	23.2
Public transportation....	4,587	100.0	2.9	5.6	17.9	3.5	19.1	22.9	28.1	39.5
Bus or streetcar.....	2,958	100.0	2.9	6.5	23.3	4.6	21.1	21.5	20.1	35.4
Subway or elevated.....	1,124	100.0	0.7	1.1	8.6	1.6	19.9	30.7	37.4	45.0
Railroad.....	387	100.0	1.3	1.0	3.1	0.8	5.9	18.1	69.8	62.4
Taxicab.....	118	100.0	28.8	41.5	21.2	2.5	3.4	-	2.5	13.2
Bicycle.....	432	100.0	38.4	23.4	28.5	2.1	4.4	2.8	0.7	12.1
Motorcycle.....	285	100.0	28.1	18.9	30.2	3.9	12.3	5.6	1.1	16.0
Walk only.....	3,645	100.0	59.3	19.9	15.3	0.7	2.7	1.7	0.3	8.7
Other means.....	210	100.0	22.4	11.4	29.0	2.4	4.8	7.1	22.4	29.5

¹Excludes workers with no fixed place of work and workers who worked at home.

Table M. Place of Residence by Place of Work, by Means of Transportation and Average (Mean) Travel Time to Work

(For the United States: 1975. Workers 14 years old and over. SMSA's as of the 1970 census)

Means of transportation by average (mean) travel time to work (minutes)	Living in SMSA central cities				
	Total ¹	Working --			
		In SMSA of residence		In another SMSA	In non-metropolitan area
		Inside central cities	Outside central cities		
All workers ²	21.4	19.7	24.0	38.0	38.5
Drive alone.....	17.6	15.5	21.6	33.8	34.1
Carpool.....	21.4	18.3	26.3	41.0	43.0
Public transportation.....	37.1	35.9	46.5	55.8	70.8
Other means ³	19.6	18.4	20.1	38.8	52.7
	Living in SMSA's, outside central cities				
	Total ¹	Working --			
		In SMSA of residence		In another SMSA	In non-metropolitan area
		Inside central cities	Outside central cities		
All workers ²	21.6	26.8	16.7	35.8	29.8
Drive alone.....	19.4	23.6	15.9	31.1	27.4
Carpool.....	24.0	27.9	19.2	36.5	36.8
Public transportation.....	44.7	46.0	29.0	66.5	35.6
Other means ³	17.0	27.6	12.5	32.0	23.6
	Living in nonmetropolitan area				
	Total ¹	Working --			
		In SMSA's		In non-metropolitan area	
		Inside central cities	Outside central cities		
All workers ²	17.9	45.8	37.6	15.2	
Drive alone.....	15.8	42.4	34.0	13.6	
Carpool.....	23.6	47.3	43.3	19.6	
Public transportation.....	37.9	85.5	60.3	24.2	
Other means ³	15.5	31.2	21.3	14.9	

¹Includes workers with place of work not reported not shown separately.²Excludes workers with no fixed place of work, and workers who walked to work or worked at home.³Includes workers using bicycles, motorcycles, and all other means not listed.

Source: Table 2.

minutes) than workers who made the reverse commute (24 minutes).

As could be expected, commuters going from central cities to nonmetropolitan jobs took an average of 39 minutes to get to work, compared with suburb-to-nonmetropolitan commuters who averaged 30 minutes. Persons living and working in nonmetropolitan areas spent only 15 minutes, on the average, traveling between home and work. However, those who lived in a nonmetropolitan area and worked in a central city or its suburbs spent an average of 46 minutes and 38 minutes getting to work respectively.

SELECTED CHARACTERISTICS OF COMMUTERS BY TRAVEL-TO-WORK CHARACTERISTICS

Means of Transportation to Work by Characteristics of Commuters

Sex. Women were more likely to use carpools or public transportation to get to work, and less likely to drive alone to work than men in 1975 (table N).

Race. Black workers were more likely to use carpools or public transportation to get to work, and less likely to drive

alone to work than White¹ workers. About 16 percent of all Black workers in the United States used public transportation compared with 5 percent of all White workers.

Household relationship. Female household heads were more likely to use public transportation to get to work and less likely to drive alone or use carpools than male household heads in 1975. This may be attributed in part to the relatively low rate of availability of automobiles among female household heads. About 14 percent of the female household heads used public transportation to get to work compared with 4 percent of the male household heads.

Comparing working wives with female household heads, the data show that wives were not nearly as dependent upon public transportation to get to work as female household heads, but instead wives evidenced a higher rate of carpooling to get to work. This may reflect, to some extent, wives being dropped off by their husbands on their way to work.

Earnings. Workers who drove alone to work generally had higher earnings than those using carpools or public trans-

¹ The racial category "White and other races" is referred to as "White" in the text for convenience.

Table N. Means of Transportation to Work by Selected Characteristics of Commuters

(For the United States: 1975. Workers 14 years old and over. For explanation of symbols, see text)

Characteristics	All workers (thousands)	Percent by means of transportation						
		Total	Auto or truck		Public transportation	Walk only	Other means	Work at home
			Drive alone	Carpool				
All workers.....	80,125	100.0	65.3	19.4	6.0	4.7	1.3	3.2
SEX								
Male.....	49,106	100.0	68.8	17.7	4.6	3.9	1.8	3.3
Female.....	31,019	100.0	59.6	22.2	8.3	6.1	0.6	3.1
RACE								
White and other.....	72,782	100.0	66.7	18.9	5.0	4.6	1.4	3.4
Black.....	7,343	100.0	51.4	25.0	16.0	5.6	0.8	1.2
HOUSEHOLD RELATIONSHIP								
Head.....	49,011	100.0	69.2	16.8	5.8	3.9	1.2	3.1
Male.....	41,825	100.0	70.7	17.2	4.3	3.3	1.3	3.3
Female.....	7,186	100.0	60.9	14.8	14.3	7.5	0.5	2.1
Wife of head.....	18,441	100.0	61.3	24.3	5.5	4.7	0.5	3.7
Other member.....	12,673	100.0	55.7	22.5	7.8	7.9	3.1	3.0
EARNINGS								
Without earnings or not reported...	7,168	100.0	55.4	13.7	3.3	6.3	1.2	20.1
With earnings.....	72,957	100.0	66.2	20.0	6.3	4.6	1.3	1.6
\$1 to \$1,999.....	9,293	100.0	53.3	22.2	6.5	10.2	3.3	4.6
\$2,000 to \$3,999.....	7,867	100.0	59.4	21.9	7.3	7.3	1.8	2.4
\$4,000 to \$5,999.....	9,022	100.0	60.7	23.6	7.4	5.7	1.0	1.6
\$6,000 to \$7,999.....	9,344	100.0	64.4	21.8	7.5	4.2	1.1	1.0
\$8,000 to \$9,999.....	8,054	100.0	69.2	19.4	5.9	3.8	0.8	0.8
\$10,000 to \$11,999.....	7,880	100.0	71.6	18.6	5.5	2.7	0.9	0.8
\$12,000 to \$14,999.....	9,193	100.0	73.6	18.1	4.5	2.2	1.0	0.6
\$15,000 to \$19,999.....	7,150	100.0	74.9	16.8	5.0	1.5	1.0	0.8
\$20,000 to \$24,999.....	2,738	100.0	75.2	16.3	5.7	1.1	0.8	0.9
\$25,000 or more.....	2,417	100.0	74.5	12.8	8.6	1.8	1.0	1.2
Median.....	\$8,237	...	\$9,090	\$7,363	\$7,282	\$4,568	\$5,061	\$3,542
Mean.....	\$9,207	...	\$9,876	\$8,185	\$8,954	\$5,678	\$8,524	\$5,842

portation in 1975. The median earnings of those who drove alone was about \$9,100 compared to about \$7,400 for workers in carpools and about \$7,300 for workers using public transportation. The median earnings of the latter two groups of workers were not significantly different.

Characteristics of Commuters by Distance to Work

Sex. Men generally traveled farther to work than women in 1975 (table O). The average commuting trip for male workers was about 10 miles, while a comparable trip for female workers was about 7 miles.

Race. The survey results suggest that White workers traveled farther to work than Black workers, but the difference is negligible. The average work trip among White workers was about 9 miles, compared to about 8 miles for Black workers.

Household relationship. Male household heads typically made longer commuting trips than either female heads or working wives. The average work trip of male household heads was about 11 miles, while the average trip for both female household heads and working wives was about 7 miles.

Earnings. The survey results show that workers' earnings were directly related to their average travel distance to work in 1975. Workers with higher earnings tended to live farther from work, while workers with lower earnings tended to live closer to work. Such a pattern points up the ability of higher-paid workers to afford the cost of commuting to work from areas more distant from their job site which offer desirable residential amenities.

Means of Transportation by Race for Workers in Major Commuting Flows

Using the proportion of Black workers living within a geographic sector (i.e., central cities, suburbs, non-metropolitan area) as the proportion also expected to be found in commuting flows originating from that sector, it is possible to examine whether Black workers were over-represented or underrepresented among commuters in the particular flows. The data in table P suggest that Black workers did not tend to be overrepresented or underrepresented in most commuting flows in 1975. In fact, the only notable deviations from expected levels of Black involvement occurred among central city-to-nonmetropolitan area and nonmetropolitan area-to-central city commuters

Table O. Selected Characteristics of Commuters by Distance to Work

(For the United States: 1975. Workers 14 years old and over. For explanation of symbols, see text)

Characteristics	Total ¹ (thousands)	Percentage distribution by distance to work (miles)									Mean
		Total	Less than 1 mile	1 to 2 miles	3 to 4 miles	5 to 9 miles	10 to 14 miles	15 to 24 miles	25 to 49 miles	50 miles or more	
All workers.....	70,816	100.0	12.3	16.0	17.2	21.6	13.5	12.3	6.1	0.9	8.5
SEX											
Male.....	42,031	100.0	10.8	14.1	16.4	21.0	14.2	14.1	8.0	1.4	9.7
Female.....	28,785	100.0	14.6	18.7	18.3	22.5	12.4	9.7	3.4	0.3	6.7
RACE											
White and other.....	64,070	100.0	12.4	16.1	17.0	21.5	13.4	12.3	6.3	1.0	9.2
Black.....	6,746	100.0	11.5	15.5	18.9	22.4	14.0	12.2	4.8	0.8	8.1
HOUSEHOLD RELATIONSHIP											
Head.....	42,436	100.0	10.8	14.3	17.1	21.0	14.1	13.7	7.7	1.3	9.5
Male.....	35,706	100.0	10.0	13.4	16.3	21.0	14.6	14.6	8.6	1.5	10.8
Female.....	6,730	100.0	15.4	18.7	21.1	21.2	11.8	8.7	2.9	0.2	6.9
Wife of head.....	17,036	100.0	13.8	18.5	17.5	23.0	13.0	10.2	3.6	0.3	7.0
Other member.....	11,344	100.0	15.7	18.8	16.8	21.7	11.8	10.3	4.2	0.6	7.1
EARNINGS											
Without earnings or not reported.....	4,604	100.0	22.2	18.5	16.7	19.4	10.3	8.2	4.0	0.7	6.5
With earnings.....	66,212	100.0	11.6	15.8	17.2	21.8	13.7	12.6	6.3	1.0	9.3
\$1 to \$1,999.....	8,058	100.0	21.0	21.3	18.0	19.5	9.6	7.5	2.7	0.4	5.7
\$2,000 to \$3,999.....	7,135	100.0	17.0	19.9	18.5	20.5	10.9	9.2	3.6	0.4	6.5
\$4,000 to \$5,999.....	8,376	100.0	13.7	18.8	18.4	21.6	12.7	10.1	4.0	0.7	7.2
\$6,000 to \$7,999.....	8,791	100.0	11.5	16.5	18.2	22.6	13.9	11.5	4.9	0.8	8.0
\$8,000 to \$9,999.....	7,475	100.0	11.1	14.6	17.8	22.6	13.9	12.7	6.5	0.9	8.8
\$10,000 to \$11,999.....	7,265	100.0	8.5	13.0	16.2	22.6	15.9	14.9	7.7	1.2	9.9
\$12,000 to \$14,999.....	8,376	100.0	7.3	13.4	16.2	22.6	15.0	15.6	8.6	1.2	10.3
\$15,000 to \$19,999.....	6,329	100.0	5.8	11.6	15.3	22.2	16.1	17.1	9.8	2.0	11.5
\$20,000 to \$24,999.....	2,342	100.0	4.6	10.1	14.5	20.6	19.3	17.8	11.2	2.0	12.3
\$25,000 or more.....	2,065	100.0	4.9	8.9	14.2	22.9	16.2	18.7	12.7	1.5	12.3
Median.....	\$8,200	...	\$5,650	\$6,724	\$7,719	\$8,445	\$9,370	\$10,185	\$11,246	\$11,671	...
Mean.....	\$9,130	...	\$6,514	\$7,654	\$8,624	\$9,519	\$10,094	\$10,761	\$11,937	\$11,810	...

¹Excludes workers with no fixed place of work and workers who worked at home.

Table P. Place of Residence by Place of Work, by Means of Transportation and Race

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census. For explanation of symbols, see text)

Means of transportation by race	Living in SMSA central cities				
	Total ¹	Working --			
		In SMSA of residence		In another SMSA	In nonmetropolitan area
		Inside central cities	Outside central cities		
All workers.....	22,760	16,338	3,724	506	278
Percent White and other races....	81.3	81.3	80.6	83.2	89.2
Percent Black.....	18.7	18.7	19.4	16.8	10.8
Drive alone.....	13,622	9,152	2,684	316	170
Percent White and other races.....	84.1	83.8	83.9	84.2	91.8
Percent Black.....	15.9	16.2	16.1	15.8	8.2
Carpool.....	3,935	2,671	780	123	84
Percent White and other races.....	79.7	81.2	75.0	82.9	81.0
Percent Black.....	20.3	18.8	25.0	17.1	19.0
Public transportation.....	3,188	2,674	209	54	10
Percent White and other races.....	68.8	69.9	57.9	74.1	100.0
Percent Black.....	31.2	30.1	42.1	25.9	-
Other means ²	2,015	1,842	51	13	14
Percent White and other races.....	85.7	85.7	86.3	100.0	100.0
Percent Black.....	14.3	14.3	13.7	-	-
	Living in SMSA's, outside central cities				
	Total ¹	Working --			
		In SMSA of residence		In another SMSA	In nonmetropolitan area
		Inside central cities	Outside central cities		
All workers.....	32,658	8,932	18,001	1,919	727
Percent White and other races....	95.2	93.8	95.5	96.2	94.9
Percent Black.....	4.8	6.2	4.5	3.8	5.1
Drive alone.....	22,756	5,965	12,523	1,266	495
Percent White and other races.....	95.9	93.8	96.3	97.0	96.6
Percent Black.....	4.1	6.2	3.7	3.0	3.4
Carpool.....	6,185	2,007	3,197	416	177
Percent White and other races.....	93.5	93.7	93.0	96.6	90.4
Percent Black.....	6.5	6.3	7.0	3.4	9.6
Public transportation.....	1,437	862	318	185	5
Percent White and other races.....	89.8	92.9	83.0	90.8	80.0
Percent Black.....	10.2	7.1	17.0	9.2	20.0
Other means ²	2,280	97	1,963	53	49
Percent White and other races.....	96.1	94.8	96.0	92.5	98.0
Percent Black.....	3.9	5.2	4.0	7.5	2.0
	Living in nonmetropolitan area				
	Total ¹	Working --			
		In SMSA's		In nonmetropolitan area	
		Inside central cities	Outside central cities		
All workers.....	24,707	997	1,090	20,221	
Percent White and other races....	93.8	96.6	94.6	93.7	
Percent Black.....	6.2	3.4	5.4	6.3	
Drive alone.....	15,916	559	659	12,928	
Percent White and other races.....	95.7	98.0	95.4	95.6	
Percent Black.....	4.3	2.0	4.6	4.4	
Carpool.....	5,455	385	400	4,155	
Percent White and other races.....	88.4	94.5	94.5	87.7	
Percent Black.....	11.6	5.5	5.5	12.3	
Public transportation.....	201	37	10	140	
Percent White and other races.....	81.6	94.6	80.0	77.9	
Percent Black.....	18.4	5.4	20.0	22.1	
Other means ²	3,134	16	22	2,997	
Percent White and other races.....	94.3	100.0	77.3	94.5	
Percent Black.....	5.7	-	22.7	5.5	

¹Includes workers with no fixed place of work and workers who did not report a place of work not shown separately.

²Includes workers using bicycles or motorcycles, workers who walked to work or worked at home, and workers using other means not listed.

where Blacks were somewhat underrepresented. The commuting flows with the largest proportion of Black workers—workers living and working within central cities and those living in central cities and working in the suburbs—did not evidence a disproportionate number of either racial group.

When the means of transportation to work is taken into account, Blacks were significantly overrepresented among the public transportation users living in each geographic sector and in most major commuting flows in 1975. This disparity is most noticeable among workers who lived in central cities but commuted out to suburban jobs. Whereas Blacks represented about 19 percent of all workers who lived in central cities and worked in the suburbs, they made up 42 percent of the workers in that flow who depended upon public transportation to get to work. This level of dependency, along with the increasing importance of suburban employment shown earlier in the report, would seem to point up the problem of central city Blacks in getting access to job opportunities in areas to which regular public transportation service may not be readily available.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Travel-to-Work Supplement to the Annual Housing Survey. The travel-to-work data presented in this report are based on information collected by personal interview during October through December 1975, as part of the enumeration for the Annual Housing Survey national sample. In all, the

occupants of about 65,700 sample households were eligible to answer the inquiries contained in the Travel-to-Work Supplement. The interviews resulted in 136,800 respondents. A facsimile of the Supplement can be found in appendix B.

Data were collected for sample households located in the counties and independent cities comprising the 461 sample areas used in current surveys of the Census Bureau. A sample of housing units was selected in these areas from the 1970 census and updated to take into account new construction and demolitions or conversions which had occurred since 1970. A more detailed description of the survey design and sampling procedures can be found in appendix A.

The Travel-to-Work Supplement was also included for the 1975-76, 1976-77, and 1977-78 Annual Housing Survey SMSA samples, each of which contained about 140,000 households spread over 20 SMSA's (for operational reasons, the 1975-76 enumeration covered 21 areas). The 3-year cycle of surveys thus resulted in enumeration of about 420,000 metropolitan households in 60 SMSA's in a 3-year period. Each of the survey groups of SMSA's contained four very large SMSA's with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. The remaining SMSA's each contained about 5,000 sample housing units distributed in proportion to the actual distribution of housing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census. Below is a list of SMSA's in each group and the period in which they were surveyed for the Travel-to-Work Supplement:

SURVEY GROUP I (1977 to 1978)

Albany-Schenectady-Troy, N.Y.
Anaheim-Santa Ana-Garden Grove,
Calif.
Boston, Mass.*
Dallas, Tex.
Detroit, Mich.*
Fort Worth, Tex.
Los Angeles-Long Beach, Calif.*
Madison, Wis.†
Memphis, Tenn.-Ark.
Minneapolis-St. Paul, Minn.
Newark, N.J.
Orlando, Fla.
Phoenix, Ariz.
Pittsburgh, Pa.
Saginaw, Mich.
Salt Lake City, Utah
Spokane, Wash.
Tacoma, Wash.
Washington, D.C.-Md.-Va.*
Wichita, Kans.

SURVEY GROUP II (1975 to 1976)

Atlanta, Ga.*
Chicago, Ill.*
Cincinnati, Ohio-Ky.-Ind.
Colorado Springs, Colo.
Columbus, Ohio
Hartford, Conn.
Kansas City, Mo.-Kans.
Miami, Fla.
Milwaukee, Wis.
New Orleans, La.
Newport News-Hampton, Va.
Paterson-Clifton-Passaic, N.J.
Philadelphia, Pa.-N.J.*
Portland, Oreg.-Wash.
Rochester, N.Y.
San Antonio, Tex.
San Bernardino-Riverside-Ontario,
Calif.
San Diego, Calif.
San Francisco-Oakland, Calif.*
Springfield-Chicopee-Holyoke,
Mass.-Conn.

SURVEY GROUP III (1976 to 1977)

Allentown-Bethlehem-Easton, Pa.-N.J.
Baltimore, Md.
Birmingham, Ala.
Buffalo, N.Y.
Cleveland, Ohio
Denver, Colo.
Grand Rapids, Mich.
Honolulu, Hawaii
Houston, Tex.*
Indianapolis, Ind.
Las Vegas, Nev.
Louisville, Ky.-Ind.
New York, N.Y.*
Oklahoma City, Okla.
Omaha, Nebr.-Iowa
Providence-Pawtucket-Warwick, R.I.-
Mass.
Raleigh, N.C.
Sacramento, Calif.
St. Louis, Mo.-Ill.*
Seattle-Everett, Wash.*

* Sample size of 15,000 housing units; all others are 5,000 housing units.

† Included with Group II for the first (1975-76) enumeration.

Related travel-to-work data. In addition to this report, data from the Travel-to-Work Supplement will also be available in the form of unpublished tables and a microdata tape. The unpublished tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and income. Some tables also provide breakdowns by census region and division. Information on these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

The microdata tape will provide records for unidentified individuals in geographical aggregates with a resident population of at least 250,000. Information on the tape will include the transportation-related items from the Travel-to-Work Supplement and selected demographic and household characteristics from the Annual Housing Survey. It may be obtained by writing to the Chief, Customer Services Branch, Data User Services Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Several data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement as well. They include published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each SMSA. Data for the SMSA's in Survey Group II are currently available in **Current Population Reports**, Series P-23, No. 68, "Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975," and in the other forms listed above. Data for the SMSA's in Survey Group III are only available in **Current Population Reports**, Series P-23, No. 72 "Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976" at this time. No data for the SMSA's in Survey Group I have yet been released.

Comparison of Travel-to-Work Supplement data with data from the 1970 census. Data from the Travel-to-Work Supplement to the 1975 Annual Housing Survey pertain to

workers, 14 years old and over, who were living in households. Workers living in group quarters in 1975 were thus excluded from the universe.

In contrast to the survey, journey-to-work data from the 1970 census pertain to all workers 14 years old and over, regardless of whether they live in households or group quarters. Consequently, the universes of the two sets of data are not exactly comparable. Creation of a comparable 1970 data set would require an extensive special tabulation of census data, based exclusively on workers living in housing units in 1970.

As an alternative to such a special tabulation, the 1970 census data used in this report are taken from table 26, "Place of Work of Civilian Persons 16 Years Old and Over at Work During Census Week by Poverty Status in 1969, Family Status, Other Selected Characteristics, and Race: 1970," published in U.S. Bureau of the Census, **Census of Population: 1970 Subject Reports**, Final Report PC(2)-9A, "Low Income Population," U.S. Government Printing Office, Washington, D.C., 1973. This published tabulation excludes workers who were inmates of institutions, members of the Armed Forces living in barracks, and college students living in dormitories—persons that made up the large majority of workers living in group quarters in 1970. However, it includes workers living in rooming houses, boarding houses, or other group quarters not specifically excluded, and its universe is workers 16 years old and over.

Given the limitations on comparability between the survey data and 1970 census data described above, comparisons made in this report between travel-to-work characteristics in 1970 and 1975 are made only between the relative proportion of workers evidencing the characteristic in the two periods. Changes which have occurred between 1970 and 1975 are thus measured in "percentage point differences" (e.g. the difference between the percent of workers who used public transportation in 1970 and the percent who used public transportation in 1975), rather than the customary "percent change."

Table 1. Place of Residence by Place of Work, by Means of Transportation and Travel Distance to Work

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census.
For explanation of symbols, see text)

Means of transportation by distance to work	Living in SMSA central cities					Living in SMSA's, outside central cities					Living in nonmetropolitan area			
	Total ¹	Working --				Total ¹	Working --				Total ¹	Working --		
		In SMSA of residence		In another SMSA	In non-metropolitan area		In SMSA of residence		In another SMSA	In non-metropolitan area		In SMSA central cities	In SMSA's outside central cities	In non-metropolitan area
		Inside central cities	Outside central cities				Inside central cities	Outside central cities						
All workers ²	19,375	14,704	3,700	498	267	28,063	8,909	16,315	1,892	687	19,733	987	1,079	17,493
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 1 mile.....	5.5	6.7	1.7	0.4	0.7	6.0	0.9	9.4	2.5	2.9	13.4	0.8	0.5	15.0
1 to 2 miles.....	17.3	20.8	6.9	2.8	3.4	12.9	4.3	18.8	5.5	5.5	20.6	1.2	1.9	23.0
3 to 4 miles.....	23.4	26.2	16.4	4.4	5.6	16.0	12.0	19.5	6.7	9.5	15.9	0.8	3.8	17.5
5 to 9 miles.....	26.2	25.8	29.3	17.5	16.1	23.7	27.4	22.9	13.7	15.0	18.2	3.9	10.8	19.0
10 to 14 miles.....	14.2	12.4	21.1	16.1	13.9	16.7	23.5	13.1	15.7	18.5	10.7	7.6	12.0	10.8
15 to 24 miles.....	9.8	7.0	18.1	25.3	21.3	16.5	22.7	11.9	24.6	24.0	11.0	24.0	26.0	9.5
25 miles or more.....	3.5	1.0	6.5	34.1	38.6	8.3	9.2	4.4	31.3	24.6	10.3	61.6	44.9	5.3
Mean.....	7.3	5.8	10.3	20.8	23.4	9.9	11.9	7.5	19.2	18.1	9.2	30.1	25.3	7.0
Drives alone.....	12,438	9,152	2,684	316	170	20,457	5,965	12,523	1,266	495	14,292	559	659	12,928
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 1 mile.....	6.1	7.6	2.1	0.6	1.2	6.1	1.1	9.1	2.6	3.8	14.7	0.5	0.6	16.2
1 to 2 miles.....	17.6	21.7	6.5	1.9	2.9	13.2	4.1	18.7	5.8	6.1	21.6	1.1	1.7	23.7
3 to 4 miles.....	23.7	26.7	16.8	3.8	7.1	17.1	13.4	20.1	8.1	10.3	17.1	1.3	5.0	18.5
5 to 9 miles.....	26.7	26.1	30.0	15.5	16.5	24.7	29.1	23.6	14.8	16.0	19.1	3.9	13.1	19.4
10 to 14 miles.....	13.5	10.8	21.8	17.4	15.3	16.5	23.6	13.3	16.0	17.6	10.3	9.7	14.4	10.2
15 to 24 miles.....	9.3	6.3	16.7	27.2	25.3	15.5	21.3	11.4	25.7	25.5	9.7	27.5	28.2	8.1
25 miles or more.....	3.2	0.8	6.1	33.2	31.2	6.8	7.6	3.8	27.1	20.6	7.4	56.0	37.2	3.8
Mean.....	7.1	5.5	9.9	20.9	20.9	9.4	11.3	7.3	18.1	17.0	7.9	28.2	22.6	6.3
Carpool.....	3,683	2,671	780	123	84	5,824	2,007	3,197	416	177	4,962	385	400	4,155
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 1 mile.....	4.3	5.7	0.6	-	-	5.2	0.5	8.8	1.7	0.6	8.4	0.8	-	9.9
1 to 2 miles.....	16.6	20.2	7.7	3.3	-	11.2	4.6	16.8	4.1	2.8	16.5	1.0	1.0	19.5
3 to 4 miles.....	21.8	25.8	14.1	1.6	-	12.9	9.1	16.7	4.6	7.3	12.3	0.3	1.8	14.4
5 to 9 miles.....	25.7	26.4	26.2	13.0	13.1	21.6	24.9	21.2	12.7	11.3	16.0	2.9	6.5	18.1
10 to 14 miles.....	14.0	12.6	18.7	13.8	10.7	18.0	24.1	14.0	18.3	21.5	12.2	4.7	8.3	13.3
15 to 24 miles.....	12.0	7.6	24.2	26.8	16.7	18.9	24.6	15.0	19.7	20.3	15.7	21.3	23.0	14.5
25 miles or more.....	5.5	1.6	8.6	41.5	51.2	12.2	12.2	7.4	38.7	36.2	18.9	68.8	59.3	10.3
Mean.....	8.5	6.1	11.9	23.1	29.2	11.6	13.1	8.9	21.0	21.9	13.3	32.9	30.2	9.9
Public transportation..	3,007	2,674	209	54	10	1,391	862	318	185	5	189	37	10	140
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 1 mile.....	3.1	3.3	1.0	-	-	1.4	-	6.0	-	-	9.5	-	-	12.9
1 to 2 miles.....	15.9	17.0	7.2	3.7	-	9.1	3.8	27.0	3.2	-	28.0	2.7	10.0	36.4
3 to 4 miles.....	25.2	26.1	19.1	14.8	-	13.7	9.5	31.4	3.2	-	15.9	2.7	10.0	18.6
5 to 9 miles.....	26.2	25.4	33.0	33.3	40.0	20.3	22.0	22.3	9.7	40.0	18.5	10.8	30.0	20.0
10 to 14 miles.....	17.8	17.7	20.1	13.0	-	16.8	21.5	7.2	8.1	40.0	3.7	2.7	-	5.0
15 to 24 miles.....	9.6	9.1	14.8	11.1	-	23.3	29.0	5.0	29.7	20.0	3.7	-	20.0	3.6
25 miles or more.....	2.3	1.4	4.8	22.2	60.0	15.5	14.2	1.3	45.4	20.0	20.1	81.1	30.0	4.3
Mean.....	7.2	6.8	8.0	16.3	21.7	13.0	13.8	3.6	23.5	14.6	10.9	32.7	18.5	4.8
Other means ³	247	208	27	6	3	391	75	277	26	9	290	7	10	269
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 1 mile.....	24.3	28.4	3.7	-	-	27.4	8.0	33.9	26.9	-	34.8	28.6	10.0	36.4
1 to 2 miles.....	36.0	36.5	29.6	33.3	66.7	31.2	17.3	34.3	26.9	44.4	33.4	28.6	40.0	33.5
3 to 4 miles.....	11.7	11.5	14.8	-	-	11.0	9.3	13.0	-	-	12.8	-	-	13.8
5 to 9 miles.....	12.1	9.1	22.2	50.0	-	13.0	32.0	9.4	3.8	11.1	11.0	-	10.0	10.4
10 to 14 miles.....	10.5	8.7	22.2	-	66.7	8.4	21.3	4.7	11.5	11.1	4.8	14.3	10.0	4.1
15 to 24 miles.....	4.9	5.3	7.4	-	-	6.4	12.0	4.0	11.5	22.2	2.4	14.3	10.0	1.5
25 miles or more.....	0.8	-	-	33.3	-	2.6	2.7	0.4	19.2	11.1	0.7	14.3	10.0	0.4
Mean.....	4.0	3.3	6.5	11.6	8.0	4.4	7.6	2.9	10.0	11.4	2.9	9.7	8.0	2.5

¹Includes workers with place of work not reported not shown separately.

²Excludes workers with no fixed place of work, and workers who walked to work or worked at home.

³Includes workers using bicycles, motorcycles, and all other means not listed.

Table 2. Place of Residence by Place of Work, by Means of Transportation and Travel Time to Work

(For the United States: 1975. Workers 14 years old and over. Number of workers in thousands. SMSA's as of the 1970 census. For explanation of symbols, see text)

Means of transportation by travel time to work	Living in SMSA central cities					Living in SMSA's, outside central cities					Living in nonmetropolitan area			
	Total ¹	Working --				Total ¹	Working --				Total ¹	Working --		
		In SMSA of residence		In another SMSA	In non-metropolitan area		In SMSA of residence		In another SMSA	In non-metropolitan area		In SMSA central cities	In SMSA's outside central cities	In non-metropolitan area
		Inside central cities	Outside central cities				Inside central cities	Outside central cities						
All workers ²	19,375	14,704	3,700	498	267	28,063	8,909	16,315	1,892	687	19,733	987	1,079	17,493
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10 minutes.....	13.7	16.1	7.0	1.8	1.9	17.2	4.2	26.0	7.1	8.9	28.3	0.9	2.5	31.7
10 to 14 minutes.....	18.6	20.9	12.5	5.0	8.2	16.1	10.2	20.5	8.4	10.8	20.6	1.4	4.3	22.8
15 to 24 minutes.....	35.5	35.1	38.7	22.3	27.3	31.4	35.4	29.9	21.3	30.1	27.0	9.9	21.8	27.7
25 to 29 minutes.....	5.0	4.0	8.5	7.0	5.6	5.6	7.7	4.7	4.1	5.4	3.5	6.2	8.0	3.1
30 to 34 minutes.....	12.5	11.2	16.3	17.5	15.7	13.9	19.4	10.5	16.9	15.1	9.0	18.0	18.3	8.0
35 to 49 minutes.....	8.8	7.6	11.2	22.5	14.2	10.2	15.1	6.2	19.6	15.7	6.7	31.9	21.2	4.4
50 minutes or more.....	6.0	5.0	5.8	24.1	26.6	5.7	7.9	2.1	22.7	14.0	4.9	31.6	24.0	2.3
Mean.....	21.4	19.7	24.0	38.0	38.5	21.6	26.8	16.7	35.8	29.8	17.9	45.8	37.6	15.2
Drives alone.....	12,438	9,152	2,684	316	170	20,457	5,965	12,523	1,266	495	14,292	559	659	12,928
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10 minutes.....	17.1	20.6	8.3	1.9	1.2	18.9	5.1	27.2	8.4	10.7	31.8	0.7	3.2	34.9
10 to 14 minutes.....	21.8	25.1	13.5	5.1	9.4	17.3	12.1	21.1	9.4	11.3	21.9	2.1	5.5	23.8
15 to 24 minutes.....	38.6	37.9	41.8	27.8	28.8	33.2	39.5	30.6	24.6	31.9	27.3	12.2	25.8	27.4
25 to 29 minutes.....	5.1	4.0	8.4	7.9	8.8	5.8	8.3	4.7	4.9	5.3	3.2	7.3	8.3	2.8
30 to 34 minutes.....	10.1	8.0	15.8	16.5	17.6	13.2	19.7	9.6	17.8	15.6	7.7	20.6	18.4	6.6
35 to 49 minutes.....	5.3	3.4	9.1	24.1	15.3	8.4	11.5	5.4	20.9	14.5	5.1	32.2	20.6	3.2
50 minutes or more.....	2.1	0.9	3.1	16.5	18.8	3.1	3.7	1.4	14.0	10.5	3.1	24.9	18.1	1.4
Mean.....	17.6	15.5	21.6	33.8	34.1	19.4	23.6	15.9	31.1	27.4	15.8	42.4	34.0	13.6
Carpool.....	3,683	2,671	780	123	84	5,824	2,007	3,197	416	177	4,962	385	400	4,155
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10 minutes.....	11.1	13.9	4.0	0.8	3.6	13.2	3.1	21.2	5.3	3.4	18.6	1.0	1.0	22.0
10 to 14 minutes.....	18.4	21.5	11.8	2.4	6.0	14.4	8.6	19.1	6.7	10.2	16.8	0.3	2.3	19.8
15 to 24 minutes.....	38.4	40.7	34.2	18.7	27.4	29.3	33.3	28.2	20.7	24.9	26.2	7.0	14.8	28.9
25 to 29 minutes.....	5.1	3.9	9.4	7.3	-	6.1	8.3	5.1	3.6	5.1	4.4	4.9	7.5	4.1
30 to 34 minutes.....	13.4	11.4	19.1	21.1	10.7	16.6	20.4	14.0	19.2	13.6	13.1	15.6	18.5	12.4
35 to 49 minutes.....	8.8	6.5	15.1	14.6	14.3	13.6	19.2	8.9	20.2	18.6	11.4	34.5	22.5	8.2
50 minutes or more.....	4.9	2.2	6.3	34.1	36.9	6.9	7.0	3.5	24.5	24.3	9.4	36.4	33.8	4.5
Mean.....	21.4	18.3	26.3	41.0	43.0	24.0	27.9	19.2	36.5	36.8	23.6	47.3	43.3	19.6
Public transportation..	3,007	2,674	209	54	10	1,391	862	318	185	5	189	37	10	140
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10 minutes.....	1.9	1.9	2.4	3.7	-	4.0	1.0	13.8	1.6	-	11.6	2.7	10.0	15.0
10 to 14 minutes.....	5.8	5.9	1.4	9.3	10.0	4.0	0.7	13.8	2.7	-	14.3	-	-	19.3
15 to 24 minutes.....	19.7	20.5	15.3	-	-	13.4	11.8	24.5	1.6	40.0	23.3	2.7	10.0	29.3
25 to 29 minutes.....	4.0	4.2	5.3	-	-	2.6	2.7	3.5	1.1	-	1.1	-	-	1.4
30 to 34 minutes.....	22.0	22.6	12.4	13.0	30.0	13.7	14.6	15.1	4.9	40.0	12.2	8.1	-	14.3
35 to 49 minutes.....	23.4	23.5	24.4	29.6	-	23.5	31.1	12.6	9.2	20.0	10.1	2.7	30.0	10.7
50 minutes or more.....	23.2	21.5	38.8	44.4	60.0	38.7	37.9	17.0	79.5	20.0	27.0	86.5	50.0	10.7
Mean.....	37.1	35.9	46.5	55.8	70.8	44.7	46.0	29.0	66.5	35.6	37.9	85.5	60.3	24.2
Other means ³	247	208	27	6	3	391	75	277	26	9	290	7	10	269
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 10 minutes.....	25.9	30.8	-	-	-	31.7	1.3	42.2	15.4	22.2	35.9	-	10.0	38.3
10 to 14 minutes.....	21.1	21.2	22.2	33.3	-	17.4	13.3	18.4	23.1	-	20.7	14.3	10.0	21.9
15 to 24 minutes.....	29.1	28.4	40.7	-	66.7	29.2	38.7	27.8	11.5	44.4	29.3	42.9	40.0	27.5
25 to 29 minutes.....	5.3	3.8	22.2	-	-	1.5	2.7	0.7	-	11.1	2.1	14.3	10.0	1.5
30 to 34 minutes.....	5.7	4.3	11.1	33.3	-	10.0	21.3	6.5	15.4	11.1	3.8	14.3	10.0	3.3
35 to 49 minutes.....	5.7	4.3	3.7	33.3	-	5.4	9.3	2.5	19.2	22.2	2.8	14.3	-	2.2
50 minutes or more.....	7.3	7.2	-	16.7	66.7	4.9	14.7	1.4	15.4	-	5.5	14.3	10.0	5.2
Mean.....	19.6	18.4	20.1	38.8	52.7	17.0	27.6	12.5	32.0	23.6	15.5	31.2	21.3	14.9

¹Includes workers with place of work not reported not shown separately.

²Excludes workers with no fixed place of work, and workers who walked to work or worked at home.

³Includes workers using bicycles, motorcycles, and all other means not listed.

Appendix A

DEFINITIONS AND EXPLANATIONS

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items in appendix B. An explanation of other subjects is provided below.

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household, 14 years old or over, who had a regular part-time or regular full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Place of work. The actual geographic location at which the worker usually carried out their occupational or job activities. If the person was on a business trip, on vacation, taking classes, etc., the week prior to interview, the person's usual place-of-work location was obtained. Workers who had the type of job in which they worked at one location for a period of time, then changed work locations (e.g., a temporary office worker), were asked to report the location of the first place they worked the previous week. Persons who did not usually work at the same location each day were requested to give the location where they usually reported in to begin work each day. Persons who neither worked at the same location, nor began work at the same location each day were classified as having no fixed place of work.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report in to a central location to begin work each day.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of one-ton capacity or less. Workers who used larger trucks to get to work are classified as using "other means."

Travel distance to work. The one-way, "door-to-door" distance in miles that the person usually traveled from home to work during the week prior to interview.

Travel time to work. The total elapsed time in minutes that it usually took the person to get from home to work during the week prior to interview. The elapsed time includes time spent waiting for public transportation, picking up members of carpools, etc.

Metropolitan areas. The term "metropolitan area" as used in this report refers to the 243 standard metropolitan statistical areas (SMSA's) used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, for purposes of the 1970 census and the Annual Housing Survey, a standard metropolitan statistical area was defined essentially as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more, or "twin cities" with a combined population of at least 50,000, and contiguous counties if, according to certain criteria, these were socially and economically integrated with the central county. In the New England States, SMSA's consist of towns and cities instead of counties. Each 1970 census SMSA included at least one central city, and the complete title of an SMSA identified the central city or cities.

Central cities. Each 1970 census SMSA included at least one central city. They were determined essentially according to the following criteria:

1. The largest city in an SMSA is always a central city.
2. One or two additional cities may also be named central cities on the basis and in the order of the following criteria:
 - a. The additional city or cities have at least 250,000 inhabitants.
 - b. The additional city or cities have a population of one-third or more of that of the largest city and a minimum population of 25,000.

Suburbs or suburban area. That portion of metropolitan areas which is outside of central cities is referred to in the text and tables of this report as "suburbs," "suburban area," or "in SMSA's, outside central cities." The term "suburb" is used here for convenience, since for some metropolitan areas the territory outside central cities extends beyond what might reasonably be considered suburban.

Nonmetropolitan area or territory. The territory outside metropolitan areas.

Race. Data in this report are provided separately for Black workers, and for White workers and workers of other races combined. Workers in the "White and other races" category are referred to as "White" in the text for convenience. The determination of the race of each worker was based on the observation of the enumerator, or on inquiry.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room, is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons such as lodgers, foster children, wards, or employees who share the housing unit. A person living alone in a housing unit, or a group of unrelated persons sharing a housing unit as partners, is also counted as a household.

Head of household. In the 1975 Annual Housing Survey, one person in each sample household was designated as the "head." The head of household was defined as the person who was regarded as the head by the members of the household. Married women were not classified thus, if their husbands were living with them at the time of the survey.

In the past, the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Earnings. The total amount of money earned in the last 12 months by a person working as an employee for a private employer or an incorporated business (including a farm employer or branch of government). Earnings also include

such items as piece-rate payments, commissions, tips, cash bonuses, and Armed Forces pay.

Symbols used in this report. A dash "--" means "rounds to or represents zero." Three dots "... " means "not applicable."

SOURCE AND RELIABILITY OF THE ESTIMATES

Sample Design

1975 DOT Travel-to-Work Supplement to the Annual Housing Survey-National. The 1975 estimates are based on data collected in October through December 1975 for the Annual Housing Survey (AHS)-National, conducted by the Bureau of the Census, acting as collection agent for the Department of Housing and Urban Development. Under the sponsorship of the Department of Transportation (DOT), the 1975 AHS-National questionnaire included a supplementary group of questions pertaining to travel to work. The sample for this survey was spread over 461 sample areas (called primary sampling units), comprising 923 counties and independent cities with coverage in each of the 50 States and the District of Columbia.

Approximately 72,600 sample housing units (both occupied and vacant) were eligible for interview in the 1975 Annual Housing Survey-National. Of this number approximately 65,700 housing units were occupied, thus making their occupants eligible for the DOT Travel-to-Work Supplement. However, interviews were not obtained at 3,600 households because the occupants refused to be interviewed, were not found at home after repeated visits or were unavailable for some other reason. In the interviewed AHS households, there were 137,300 persons 14 years or older who were eligible for the DOT Supplement. However, 500 of these 137,300 did not respond to the travel-to-work portion of the questionnaire.

Selection of sample areas. The United States was divided into areas made up of counties and independent cities referred to as primary sampling units (PSU's). These PSU's were then grouped into 376 strata, 156 of which consisted of only one PSU which was in sample with certainty. These 156 strata were mostly the larger SMSA's and were called self-representing (SR) since the sample from the sample area represented just that PSU. Each of the other 220 strata consisted of a group of PSU's and was referred to as non-self-representing (NSR), since the sample of housing units from the sample PSU in a stratum represented the other PSU's in the stratum as well.

One PSU was selected from each NSR stratum with probability proportionate to the 1970 census population of the PSU. (This resulted in 220 NSR sample PSU's). In addition, the NSR strata were grouped into 110 pairs and one stratum was picked at random from each pair. From this stratum, an additional PSU was selected independent of the other PSU selected from this stratum. Since the two PSU's were independently selected, it was possible for the same

PSU to be selected twice. This occurred in 25 instances, producing an additional 85 NSR sample PSU's, thus giving a grand total of 461 PSU's.

Designation of sample housing units for the 1975 AHS enumeration. The sample housing units designated to be interviewed in the 1975 AHS enumeration consisted of the following categories, which are described in detail in succeeding sections.

1. All sample housing units that were interviewed in the 1974 enumeration.
2. All sample housing units that were either type A noninterviews (i.e., units eligible to be interviewed) or type B noninterviews (i.e., units were not eligible for interview at the time of enumeration but which could become eligible in the future) in the 1974 enumeration.
3. All sample housing units that were selected from the list of building permits issued since the 1974 enumeration. (This sample represents the housing units built in permit-issuing areas, since the 1974 enumeration.)
4. Units added as the result of the updated listings in selected areas which do not issue building permits.

Selection of the 1973 sample housing units. The overall sampling rate used to select the sample for the 1973 AHS was about 1 in 1,366. The within-PSU sampling rate for AHS was determined so that the overall probability of selection for each sample housing unit was the same (e.g., if the probability of selecting a NSR PSU was 1 in 10, then the within-PSU sampling rate would be 1 in 136.6).

Within the sample PSU's, a sample of the housing units enumerated in the 1970 Census of Population and Housing was selected for AHS. In addition, a sample of new construction building permits was also selected to represent the units constructed since the 1970 census. These samples were selected at about twice the rate mentioned previously (i.e., at 2 in 1,366), thereby producing a sample twice as large as needed. This sample was split into two equal-sized samples—one to be used for AHS, and one to be held in reserve for possible future use for AHS. The procedure used to split this sample into equal-sized samples is described in the next section.

The sample of 1970 census units was selected in several stages of a sampling. Within the sample PSU's, the first step was the selection of a sample of census enumeration districts (ED's), administrative units used in the 1970 census. The probability of selection for an ED was proportional to the following 1970 census counts of housing units (HU's) and persons in group quarters, combined in the following formula:

Number of Group Quarters Persons in the ED

Number of HU's in the ED +	3
4	

The next step was to select an expected cluster of about four neighboring housing units within each sample ED. For most of the ED's, the selection was accomplished using the

list of addresses for the ED as compiled in the 1970 census. However, in those ED's where addresses were incomplete or inadequate (mostly rural areas), the selection process was accomplished using area sampling methods. These ED's were divided into segments, i.e., small land areas with well-defined boundaries, having an expected size of four or a multiple of four, housing units. Those segments with an expected size which was a multiple of four were further subsampled at the time of enumeration so that an expected four housing units were chosen for interview.

The sample of new construction units was selected from building permits issued since January 1970. Within each sample PSU, the building permits were chronologically ordered by month issued, and compact clusters of approximately four housing units were created. These clusters were then sampled for inclusion in the AHS at the sampling rate of 2 in 1,366. Housing units constructed since the 1970 census in areas which do not issue building permits were brought into the sample as a result of the area sample described above.

Splitting of the sample. The sample selection procedure as described above produced clusters (segments) of size-four housing units for the sample taken from the census address frame, the new construction frame and the area sampling frame (mainly rural areas). Clusters of this size should result in a minimum loss in precision for estimates of housing characteristics in rural areas because of the heterogeneity of neighboring units. However, clusters of size-two were considered to be more optimal within those areas where the housing characteristics of neighboring units tended to be very similar (e.g., urban areas and new construction units). A splitting operation was then carried out for segments selected from the census address and new construction frames. This consisted of halving each sample cluster from these frames. Thus, two housing units from each cluster were to be included in the survey and two housing units were held in reserve. No splitting operation was carried out within the clusters selected from the area sampling frame; instead every other area sample cluster of four housing units was used for the survey and the remaining clusters were assigned to the reserve sample.

Selection of supplemental sample housing units in rural areas. In 1974, it was decided to increase the reliability of the AHS estimates of rural housing characteristics, by doubling the number of sample housing units from rural areas. This was accomplished by reactivating the reserve sample, selected in the original sampling operations in 1973, from rural areas only. For the reserve sample selected in census address and new construction frames, this meant that the other half of each rural cluster (an expected two housing units) was reactivated in 1974. Similarly for the area sample frames, this meant the entire reserve cluster (an expected four housing units) was reactivated in 1974 if the cluster was rural. This supplementation increased the overall probability of selection for sample housing units in rural areas to about 2 in 1,366; whereas, the overall probability of selection for sample housing units in urban areas remained at 1 in 1,366.

1970 Census of Population and Housing. The estimates pertaining to the 1970 population (i.e., the population that existed at the time of the 1970 census) are based on either 20-percent, 15-percent, or 5-percent sample data collected in April 1970 for the Decennial Census of Population and Housing. A detailed description of the sample design can be obtained in the 1970 census report, PC(1)-D1, *Detailed Characteristics, United States Summary*.

Estimation

1975 DOT Travel-to-Work Supplement. The 1975 DOT Travel-to-Work Supplement employed a two-stage ratio estimation procedure. However, prior to the implementation of the procedure, the basic weight (i.e., the inverse of the probability of selection) was adjusted first to account for the type A noninterview housing units encountered in AHS and second to account for the persons in households that were interviewed for AHS-National who did not respond to the travel-to-work section of the questionnaire. The noninterview adjustment for type A housing units was done separately for different categories of occupied housing units. This noninterview adjustment was equal to the following ratio:

$$\frac{\text{Interviewed housing units} + \text{Noninterviewed housing units}}{\text{Interviewed housing units}}$$

The noninterview adjustment for the DOT Travel-to-Work Supplement interviews that were not obtained in households interviewed for AHS was done separately for different residence-age-sex-marital status categories. This noninterview adjustment was equal to the following ratio:

$$\frac{\begin{array}{l} \text{Persons who were interviewed} \\ \text{for the DOT Travel-to-work} \\ \text{Supplement in households} \\ \text{that were interviewed for} \\ \text{AHS-National} \end{array} + \begin{array}{l} \text{Persons who were not inter-} \\ \text{viewed for the DOT Travel-to-} \\ \text{work Supplement in households} \\ \text{that were interviewed for} \\ \text{AHS-National} \end{array}}{\begin{array}{l} \text{Persons who were interviewed for the DOT Travel-to-work} \\ \text{Supplement in households that were interviewed for} \\ \text{AHS-National} \end{array}}$$

The estimates used in both the numerator and the denominator were weighted sample estimates of persons after the adjustment for type A noninterview housing units had been applied.

The first-stage ratio estimation procedure was employed for sample persons from non-self-representing (NSR) PSU's only. The procedure was designed to reduce the contribution to the variation arising from the sampling of NSR PSU's. The first-stage ratio estimation procedure takes into account the differences that existed at the time of the 1970 census in the distribution by race and residence of the population estimated from the sample NSR PSU's and that of the NSR population in each of the four census regions of the country.

The first-stage ratio estimation factor for each specified category was as follows:

$$\frac{\begin{array}{l} \text{The 1970 census population in the residence-race category for all} \\ \text{NSR strata in a census region} \end{array}}{\begin{array}{l} \text{Estimate of the population category using 1970 census population} \\ \text{counts for sample NSR PSU's in a census region} \end{array}}$$

The numerators of the ratios were calculated by obtaining the 1970 census population counts for each of the residence-race categories for each NSR stratum and summing these counts across the NSR strata in each census region. The denominators were calculated by obtaining the 1970 census population counts for each of the residence-race categories for each NSR sample PSU, weighting these counts by the inverse of the probability of selecting that PSU and summing these weighted counts across the NSR PSU's in each census region. The computed first-stage ratio estimation factor was then applied to the existing weight for each NSR sample person in each first-stage ratio estimation category.

The second-stage ratio estimation procedure was employed for all sample persons 14 years or older, both civilian and military. This procedure was designed to adjust the DOT Travel-to-Work Supplement estimates of the population 14 years or older in households, (i.e., the estimates employing the two noninterview adjustments and the first-stage adjustment) to independently derived current estimates for 68 race-sex-age categories to correct for deficiencies known to exist in the AHS sample.

The second-stage ratio estimation factor for each specific category was as follows:

$$\frac{\begin{array}{l} \text{Current independent estimate of household population in the} \\ \text{race-sex-age category} \end{array}}{\begin{array}{l} \text{DOT Supplement sample estimate of household population in} \\ \text{the category} \end{array}}$$

The numerators of the ratios were derived from data based on the 1970 Census of Population and Housing, birth and death rates, immigration and emigration rates and the 1975 and 1976 March supplement of military personnel for the Current Population Survey (CPS), a sample household survey conducted monthly by the Bureau of the Census. The denominators of the ratios were the weighted estimates for the DOT Travel-to-Work Supplement sample persons, using the existing weight after the first-stage ratio estimation procedure. The computed second-stage ratio estimation factor was then applied to the existing weight for each sample person in each second-stage ratio estimation category.

The effect of the second-stage ratio estimation procedure, as well as the overall estimation procedure, was to reduce the sampling error for most statistics below what would have been obtained by simply weighting the results of the sample by the inverse of the probability of selection. The distribution of the household population 14 years or older selected for the sample differed somewhat, by chance, from that of the nation as a whole in such basic characteristics as race, sex, and age. These characteristics are probably correlated with other characteristics measured for the DOT Travel-to-Work Supplement. Therefore, through the use of the two-stage ratio estimation procedure one can expect the sample estimates to be improved substantially when the sample counts of persons 14 years and older is brought into close agreement with a known distribution of the entire population 14 years or older with respect to these basic characteristics.

Ratio Estimation Procedure of the 1970 Census of Population and Housing. This report presents data on the population characteristics of the 1970 Census of Population and Housing. The statistics based on 1970 census sample data employed a ratio estimation procedure which was applied separately for each of the three census samples, a detailed description of the ratio estimation procedure employed for the 1970 census can be obtained in the 1970 census report, PC(1)-D1, **Detailed Characteristics, United States Summary.**

Reliability of the Estimates

There are two types of possible errors associated with estimates based on data from sample surveys, sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement and of the nonsampling errors associated with the 1970 census estimates. A description of the sampling errors associated with the sample estimates from the 1970 census appears in the 1970 census report, PC(1)-D1, **Detailed Characteristics, United States Summary.** The sampling errors for 1970 census data are much smaller than those for DOT Supplement data. Therefore, in making comparisons between the two data sources, it can be safely assumed that the census data are subject to zero sampling errors.

Sampling errors. The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The variability between estimates from all possible samples is defined as the sampling error. One common measure of this sampling error is the standard error which measures the precision with which an estimate from a sample approximates the average result of all possible samples.

In addition, the standard error, as calculated for this report, also partially reflects the variation in the estimates due to some nonsampling errors, but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and nonsampling errors, measured by the standard error, and biases and some additional nonsampling errors not measured by the standard error.

The procedure, as illustrated below, provides a method to construct interval estimates such that a known proportion of the intervals would contain the average of all possible samples. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.

2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample one can say with specified confidence that the average result of all possible samples is included in the constructed interval.

All statements of comparison appearing in this report are significant at the 1.6 standard error level or higher, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by the use of the phrase, "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates shown in this report. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than the precise standard error for any specific item.

Table A-1. presents the standard errors applicable to the 1975 worker (14 years or older) estimates in this report. Linear interpolation should be used to determine standard errors for levels of estimates not specifically shown in table A-1.

The reliability of an estimated percentage, computed by using sample data for both numerator and denominator depends upon both the size of the percentage and the size of the total upon which the percentage is based. Estimated percentages are relatively more reliable than the corresponding estimates of the numerators of the percentages, particularly if the percentages are 50 percent or more.

Table A-2. presents the standard errors of estimated percentages of 1975 workers. Two-way linear interpolation should be used to determine standard errors for estimated percentages not specifically shown in table A-2.

Included in tables A-1. and A-2. are estimates of standard errors for estimates of zero and zero percent. These estimates of standard errors are considered to be overestimates of the true standard errors.

For ratios, $100(x/y)$, where x is not a subclass of y , the above table A-2. underestimates the standard error of the ratio when there is little or no correlation between x and y . For this type of ratio, a better approximation of the standard

Table A-1. Standard Errors of Estimated Number of Workers: 1975

(In thousands. 68 chances out of 100)

Size of estimate	Standard error		Size of estimate	Standard error	
	Total or White	Black		Total or White	Black
0.....	2	2	2,500.....	64	60
5.....	3	3	5,000.....	90	79
10.....	4	4	10,000.....	125	88
25.....	7	7	25,000.....	185	
50.....	9	9	50,000.....	227	
100.....	13	13	75,000.....	229	
250.....	20	20	100,000.....	192	
500.....	29	29			
1,000.....	41	40			

error may be obtained by letting the standard error of the ratio be approximately equal to:

$$(100) (x/y) \sqrt{\left(\frac{\sigma_x}{x}\right)^2 + \left(\frac{\sigma_y}{y}\right)^2}$$

where: x = the numerator of the ratio

y = the denominator of the ratio

σ_x = the standard error of the numerator

σ_y = the standard error of the denominator

Illustration of the use of the standard error tables. Table A of this report shows 20,846,000 workers living inside central cities and reporting a fixed place of work. Interpolation in table A-1 of this appendix shows that the standard error of an estimate of this size is approximately 168,000. The following procedure was used in interpolating.

The information presented in the table below was extracted from table A-1. The entry for "x" is the one sought.

Size of Estimate (thousands)	Standard Error (thousands)
10,000	125
20,846	x
25,000	185

By vertically interpolating between 125 and 185, the entry for "x" is determined to be 168.

$$20,846 - 10,000 = 10,846$$

$$25,000 - 10,000 = 15,000$$

$$125 + \frac{10,846}{15,000} (185 - 125) = 168$$

Consequently, the 68-percent confidence interval, as shown by these data, is from 20,678,000 to 21,014,000. Therefore,

a conclusion that the average estimate, derived from all possible samples, of workers living inside central cities lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 20,577,000 to 21,115,000 with 90-percent confidence; and that the average estimate lies within the interval from 20,510,000 to 21,182,000 with 95-percent confidence.

Table B shows that of the 20,846,000 workers living inside central cities and reporting a fixed place of work, 79.3 percent are working inside central cities. Interpolation in table A-2. (i.e., interpolation on both the base and percent) of this appendix shows that the standard error of the above percentage is approximately 0.5 percentage points. The following procedure was used in interpolating.

The information presented in the table below was extracted from table A-2. The entry for "p" is the one sought.

Base of percentage (thousands)	Estimated percentage		
	25 or 75	79.3	15 or 85
10,000	0.6	a	0.5
20,846 .....	...	p	...
25,000	0.4	b	0.3

1. By horizontal interpolation between 0.6 and 0.5, the entry for cell "a" is determined to be 0.6.

$$79.3 - 75.0 = 4.3$$

$$85.0 - 75.0 = 10.0$$

$$0.6 + \frac{4.3}{10.0} (0.5 - 0.6) = 0.6$$

2. By horizontal interpolation between 0.4 and 0.3, the entry for cell "b" is determined to be 0.4.

$$0.4 + \frac{4.3}{10.0} (0.3 - 0.4) = 0.4$$

3. By vertical interpolation between 0.6 and 0.4, the entry for "p" is determined to be 0.5.

$$20,846 - 10,000 = 10,846$$

$$25,000 - 10,000 = 15,000$$

$$0.6 + \frac{10,846}{15,000} (0.4 - 0.6) = 0.5$$

Consequently, the 68-percent confidence interval, as shown by these data, is from 78.8 to 79.8 percent; the 90-percent confidence interval is from 78.5 to 80.1 percent; and the 95-percent confidence interval is from 78.3 to 80.3 percent.

Differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard errors of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different areas or the difference between separate and uncorrelated characteristics in the same area. If, however, there is a high positive correlation between the two characteristics, the formula will overestimate the true error. Also, if there is a high negative correlation between the two characteristics, the formula will underestimate the true standard error.

Illustration of the computation of the standard error of a difference. Table E of this report shows that 52,294,000 workers drive alone to work and 15,575,000 carpool to work. Thus, the apparent difference between the number of workers driving alone and carpooling is 36,719,000. Table A-1. of the appendix shows that the standard error of

52,294,000 is approximately 227,000 and that the standard error of 15,575,000 is approximately 147,000. Therefore, the standard error of the estimated difference of 36,719,000 is about

$$270,000 = \sqrt{(227,000)^2 + (147,000)^2}$$

Consequently, the 68-percent confidence interval for the 36,719,000 difference is from 36,449,000 to 36,989,000. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, the 90-percent confidence interval is from 36,287,000 to 37,151,000, and the 95-percent confidence interval is from 36,179,000 to 37,259,000. Thus, we can conclude with 95-percent confidence that the number of workers driving alone is greater than the number of workers who carpool since the 95-percent confidence interval of this difference does not include zero or negative values.

Medians. For the medians presented in certain tables, the sampling error depends on the size of the base and on the distribution upon which the median is based. An approximate method for measuring the reliability of the estimated median is to determine an interval about the estimated median such that there is a stated degree of confidence that the average median from all possible samples lies within the interval. The following procedure may be used to estimate confidence limits of a median based on sample data:

1. From table A-2, determine the standard error of a 50-percent characteristic on the base of the median;
2. Add to and subtract from 50 percent the standard error determined in step 1; and
3. Using the distribution of the characteristic, read off the confidence interval corresponding to the two points established in step 2.

Table A-2. Standard Errors of Estimated Percentages of Workers: 1975

(68 chances out of 100)

Base of percentage (thousands)	Estimated percentage							
	0 or 100	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
5.....	25.3	25.3	25.3	25.3	25.3	25.3	25.3	29.1
10.....	14.5	14.5	14.5	14.5	14.5	14.7	17.8	20.6
25.....	6.3	6.3	6.3	6.3	7.8	9.3	11.3	13.0
50.....	3.5	3.5	3.5	4.0	5.5	6.6	8.0	9.2
100.....	1.7	1.7	1.8	2.8	3.9	4.6	5.6	6.5
250.....	0.7	0.8	1.2	1.8	2.5	2.9	3.6	4.1
500.....	0.3	0.6	0.8	1.3	1.7	2.1	2.5	2.9
1,000.....	0.2	0.4	0.6	0.9	1.2	1.5	1.8	2.1
2,500.....	0.07	0.3	0.4	0.6	0.8	0.9	1.1	1.3
5,000.....	0.03	0.2	0.3	0.4	0.6	0.7	0.8	0.9
10,000.....	0.02	0.13	0.2	0.3	0.4	0.5	0.6	0.7
25,000.....	0.01	0.08	0.12	0.2	0.2	0.3	0.4	0.4
50,000.....	-	0.06	0.08	0.13	0.2	0.2	0.3	0.3
75,000.....	-	0.05	0.07	0.10	0.14	0.2	0.2	0.2
100,000.....	-	0.04	0.06	0.09	0.12	0.15	0.2	0.2

For about 68 out of 100 possible samples, the average median from all possible samples would lie between these two values.

A two-standard error confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step 1. For about 95 out of 100 possible samples, the average median from all possible samples would lie between these two values.

Illustration of the computation of the 95-percent confidence interval for a median. Table 0 of this report shows the median earnings of workers with earnings was \$8,200. The base of the distribution from which this median was determined is 66,212,000.

1. From table A-2., the standard error of a 50-percent characteristic on the base of 66,212,000 is 0.2 percentage points.
2. To obtain a two-standard error confidence interval on the estimated median, add to and subtract from 50 percent twice the standard error determined in step 1. This yields percentage limits of 49.6 and 50.4.
3. From table 0, it can be seen by cumulating the frequencies for the first four categories that 32,360,000, or 48.9 percent had earnings less than \$8,000 and that an additional 7,475,000, or 11.3 percent had earnings from \$8,000 to \$9,999. By linear interpolation, the lower limit of the 95-percent confidence interval is found to be about \$8,124.

$$\$8,000 + (\$10,000 - \$8,000) \left(\frac{49.6 - 48.9}{11.3} \right) = \$8,124$$

Similarly, the upper limit of the 95-percent confidence interval is found to be about \$8,265.

$$\$8,000 + (\$10,000 - \$8,000) \left(\frac{50.4 - 48.9}{11.3} \right) = \$8,265$$

Thus, the 95-percent confidence interval ranges from \$8,124 to \$8,265.

Means. For the means presented in certain tables, the sampling error depends on the sample size, design of the sample, and the estimation procedure, as well as on the size of the base and on the distribution upon which the mean is based. To get an approximation of the standard error of a mean, the following formula can be used:

$$\sigma_{\bar{X}} = 41 \sqrt{\frac{\left(\sum_{i=1}^c P_i X_i^2 \right) - \left(\sum_{i=1}^c P_i X_i \right)^2}{Y}}$$

where c is the total number of classes,

P_i is the proportion of total cases in the i^{th} class,

X_i is the midpoint of the i^{th} class, with the midpoint of the upper open-ended class taken to be 3/2 times its lower limit,

\bar{X} is the mean,

Y is the base of the distribution,

and 41 is a constant which depends on the sample size, the sample design, and the estimation procedure.

Illustration of the computation of the standard error of a mean. Table 2 shows a distribution of travel time to work of all workers living in central city of an SMSA and working in the SMSA of residence but outside the central city. The mean travel time to work as shown in this table is 24.0 minutes. From this distribution, we can calculate

$$\left(\sum_{i=1}^c P_i X_i^2 \right) - \left(\sum_{i=1}^c P_i X_i \right)^2$$

to be approximately 244.3. The base of the distribution is 3,700,000. Therefore, the standard error of the mean 24.0 is approximately 0.3 minutes. Consequently, the 68-percent confidence interval of 24.0 minutes is from 23.7 to 24.3 minutes; the 90-percent confidence interval is from 23.5 to 24.5 minutes; and the 95-percent confidence interval is from 23.4 to 24.6 minutes.

Nonsampling Errors. In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data. As can be seen from the above list, nonsampling errors are not unique to sample surveys since they can, and do, occur in complete censuses as well.

Also, many of the DOT Travel-to-Work Supplement interviews were conducted by proxy. That is, the responses for a particular worker were given by someone else who perhaps is not as knowledgeable as the worker would be. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Hence, it is possible that biases due to proxy interviewing are present in the data. However, the magnitude of these biases, as well as other nonsampling errors, for the DOT Travel-to-Work Supplement are unknown.

Obtaining a measurement of the total nonsampling error associated with the estimates from a survey is very difficult, considering the number of possible sources of errors. However, an attempt was made to measure some of the nonsampling errors associated with the estimates for both the 1970 Census of Population and Housing and the 1975 AHS-National.

1970 Census. A number of studies were conducted to measure two types of general errors associated with 1970 census estimates: "Coverage" and "Content" errors. The

coverage" errors determined how completely housing units and people were counted in the census. The "content" errors measured the accuracy of the data collected for enumerated housing units and people. These errors were measured by reinterviews, record checks, and other surveys.

The detailed results of these studies on coverage and content errors, as well as the methodology employed, can be found in the 1970 Census of Population and Housing Evaluation and Research Program reports PHC(E)-5, *The Coverage of Housing in the 1970 Census*; PHC(E)-10, *The Accuracy of Data for Selected Housing Characteristics as Measured by Reinterviews*; PHC(E)-4, *Estimates of Coverage of Population by Sex, Race, and Age: Demographic Analysis*; and PHC(E)-9, *Accuracy of Data for Selected Population Characteristics as Measured by Reinterviews*.

Reinterview Program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the AHS-National sample, a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-National data. A reinterview program was conducted for a subsample of the AHS households. These households were revisited and answers to some of the questions on the AHS questionnaire were obtained again. The original interview and the reinterview were assumed to be two independent readings and thus were the basis for the measurement of the "content" error of these AHS estimates. As part of the reinterview, an additional check was carried out for interviewer evaluation and quality control. A check was made at each of these households to determine if the following was done during the original interview:

- The correct unit was visited.
- The correct number of housing units were interviewed at that address.
- The correct information on "Year Built" was obtained.
- The correct information on "Tenure" was obtained.
- The correct information on "Household Composition" was obtained.
- The correct information on "Type of Housing Unit" was obtained.
- The correct information on "Occupancy Status" was obtained.

The results of the reinterview study are presented in the following Census Bureau memorandum: "Response Error in the Annual Housing Survey Data — Year III, National Sample." Some of these results are:

- Approximately 75 percent of the nonattitudinal items showed low levels of inconsistency in response.

2. For the attitudinal items, most of the indices showed moderate levels of inconsistency for the reinterview sample in which reconciliation was done, i.e., after the question is answered in the reinterview, the enumerator presents the previous responses and then asks the respondent to decide upon the best answer. However, approximately one-half of the items showed high levels of inconsistency for the reinterview sample in which no reconciliation was done. Moderate levels of inconsistency in response indicate that there is some problem with inconsistent reporting; whereas, high levels indicate that improvements are needed in the method used to collect these data or that the category concepts themselves are ambiguous.
3. Reinterview results indicated that biases exist in some of the original survey distributions, most of which occurred in the attitudinal items concerning neighborhood conditions and assessing the adequacy of neighborhood services.

The 1970 census reinterview results provide illustration of possible nonsampling errors for some of the items which also appear in the AHS. For example, median value of homes was consistently underestimated by about 5 percent, and the average monthly costs of electricity and utility gas were consistently overestimated although the net effect on average gross rent was fairly small.

A possible explanation for the results of the AHS and census reinterview studies, as well as the surveys themselves, is that the data are based on the answers given by the respondent, who may lack precise information. Also, the results of the reinterview studies are derived from sample surveys so there is sampling error associated with these estimates of nonsampling error. Therefore, the possibility of such errors should be taken into account when considering the results of these studies.

Coverage Errors. With respect to errors of coverage and estimation for missing data, it is known that the AHS new construction sample had deficiencies with regard to the representation of both conventional new construction in permit-issuing areas and new construction mobile homes. During the sampling of building permits, only those issued January 1, 1970 or later were eligible to be sampled to represent conventional new construction in permit-issuing areas. It had been assumed that units with permits issued prior to 1970 would have been completed by the time of the 1970 census (i.e., April 1970), and therefore would have been represented in the sample selected from 1970 census units. However, it has been estimated that the 1975 AHS sample misses about 6 percent (i.e., about 600,000 units) of all conventional new construction (i.e., all conventional housing units built after April 1970, in both permit-issuing and nonpermit-issuing areas) because the permits for these units, which were built after April 1970, were issued before January 1970.

Also, during the sampling of building permits, only those issued more than 5 months prior to the survey were eligible to be sampled to represent conventional new construction. Due to time constraints, it is not possible to select units whose permits are issued less than 5 months in advance of the survey. It has been estimated that the 1975 AHS sample misses about 2 percent (i.e., about 200,000 units) of all conventional new construction (i.e., all conventional housing units built after April 1970) because the permits for these units, which were built before October 1975, were issued less than 5 months in advance of the survey.

In addition, unlike the procedure for conventional new construction, there was no sampling procedure specifically for new construction mobile homes. However, new mobile homes located in ED's where area sampling methods were used are represented in the AHS sample. In addition, new mobile homes located in mobile home parks sampled from the 1970 census address frames also are represented. However, new mobile homes located in mobile home parks not in existence at the time of the 1970 census have no chance of representation in the AHS sample. It has been estimated that the 1975 AHS sample misses about 15 percent of all new mobile homes (i.e., about 300,000 units).

Finally, it is felt that deficiencies also exist in ED's where area sampling methods are used. As before, it had been assumed that all units located inside these ED's would be

represented in the sample. But the 1975 AHS sample has been estimated to miss as much as 2 percent (i.e., as much as 400,000 units) of all housing units in ED's where area sampling methods are used because these units are not listed during the canvassing.

Therefore, all persons 14 years or older who live in the above "missing" housing units or who live in enumerated housing units but were not detected by the enumerators have no chance for enumeration in the DOT Travel-to-Work Supplement. The second stage of ratio estimation corrects for these deficiencies as far as the count of persons in the age-race-sex cells are concerned. However, biases associated with estimated characteristics of these age-race-sex categories may still remain.

Rounding Errors. With respect to errors associated with processing, the rounding of estimates introduces another source of error in the data, the severity of which depends on the statistic being measured. The effect of rounding is significant relative to the sampling error only for small percentages, median distance, median speed, and median amount of time when these figures are derived from relatively large bases. This means that confidence intervals formed from the standard errors given may be distorted and this should be taken into account when considering the results of the survey.

Appendix B. Facsimile of the Travel-to-Work Supplement

PGM 5

Line number of person (388)	Line number of respondent (389)	If last worker in this household, mark this box <input type="checkbox"/>
3a. What is ...'s principal means of transportation to work? (390) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } → (391) 1 <input type="checkbox"/> Drives alone – Skip to 4a 2 <input type="checkbox"/> Shares driving } 3 <input type="checkbox"/> Drives others } Skip to 3c 4 <input type="checkbox"/> Rides with someone else } 5 <input type="checkbox"/> Walks only – Skip to 4a 6 <input type="checkbox"/> Works at home – Skip to 8a 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means – Specify _____		4d. Is ...'s place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 4c(4))? (396) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Don't know
b. Does ... usually ALSO use a car for part of the trip to work? (392) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No – Skip to 4a		5. What time does ... usually leave for work? (397) _____ Time (398) 1 <input type="checkbox"/> a.m. 2 <input type="checkbox"/> p.m.
c. How many people, including ..., usually ride in the car to work? (393) _____ Number		6. How long does it usually take ... to get from home to work? (399) _____ Minutes
4a. Does ... usually WORK at the same location each day? (394) 1 <input type="checkbox"/> Yes – Skip to 4c 2 <input type="checkbox"/> No		7. What is ...'s ONE-WAY distance from home to work? (400) _____ Miles OR <input type="checkbox"/> Less than 1 mile
b. Does ... usually REPORT to the same location to begin work each day? (395) 3 <input type="checkbox"/> Yes 4 <input type="checkbox"/> No – Skip to 8a		8a. In the last year, has ... changed his principal means of transportation to work? (401) 1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No – Skip to 9
c. Where is ...'s usual place of work? (1) Company or business establishment name _____ _____ _____ (2) Address (Number and street) Note – If address (number and street name) are not known, enter building name, shopping center name, or other physical location description. _____ _____ _____ (3) Names of nearest intersecting streets _____ _____ _____ (4) Name of city, town, village, borough, etc. _____ _____ _____ (5) County _____ State ZIP code _____		b. What was ...'s principal means of transportation to work (prior to the change)? (402) 1 <input type="checkbox"/> Truck } 2 <input type="checkbox"/> Car or carpool } → (403) 1 <input type="checkbox"/> Drove alone 2 <input type="checkbox"/> Shared driving 3 <input type="checkbox"/> Drove others 4 <input type="checkbox"/> Rode with someone else 5 <input type="checkbox"/> Walked only 6 <input type="checkbox"/> Worked at home 7 <input type="checkbox"/> Railroad 8 <input type="checkbox"/> Subway or elevated 9 <input type="checkbox"/> Bus or streetcar 10 <input type="checkbox"/> Taxicab 11 <input type="checkbox"/> Motorcycle 13 <input type="checkbox"/> Bicycle 12 <input type="checkbox"/> Other means – Specify _____
9. If "Yes" marked in 8a – ASK Compared to ...'s previous means of transportation to work (Given in 8b), how satisfied is ... with his present means of transportation to work – much more, more, about the same, less or much less satisfied? (404) 1 <input type="checkbox"/> Much more satisfied 2 <input type="checkbox"/> More satisfied 3 <input type="checkbox"/> About the same satisfaction 4 <input type="checkbox"/> Less satisfied 5 <input type="checkbox"/> Much less satisfied 6 <input type="checkbox"/> Don't know 7 <input type="checkbox"/> Did not work last year		If "No" marked in 8a – ASK Compared to a year ago, how satisfied is ... now with his principal means of transportation to work – much more, more, about the same, less or much less satisfied? _____
INTERVIEWER		Be sure to transcribe items 2c, 3a, 3b, 6 and 7 for head of household to items 82a–e on page 13 of AHS-2 questionnaire.
Ask Question 10, page 39, for the HEAD		

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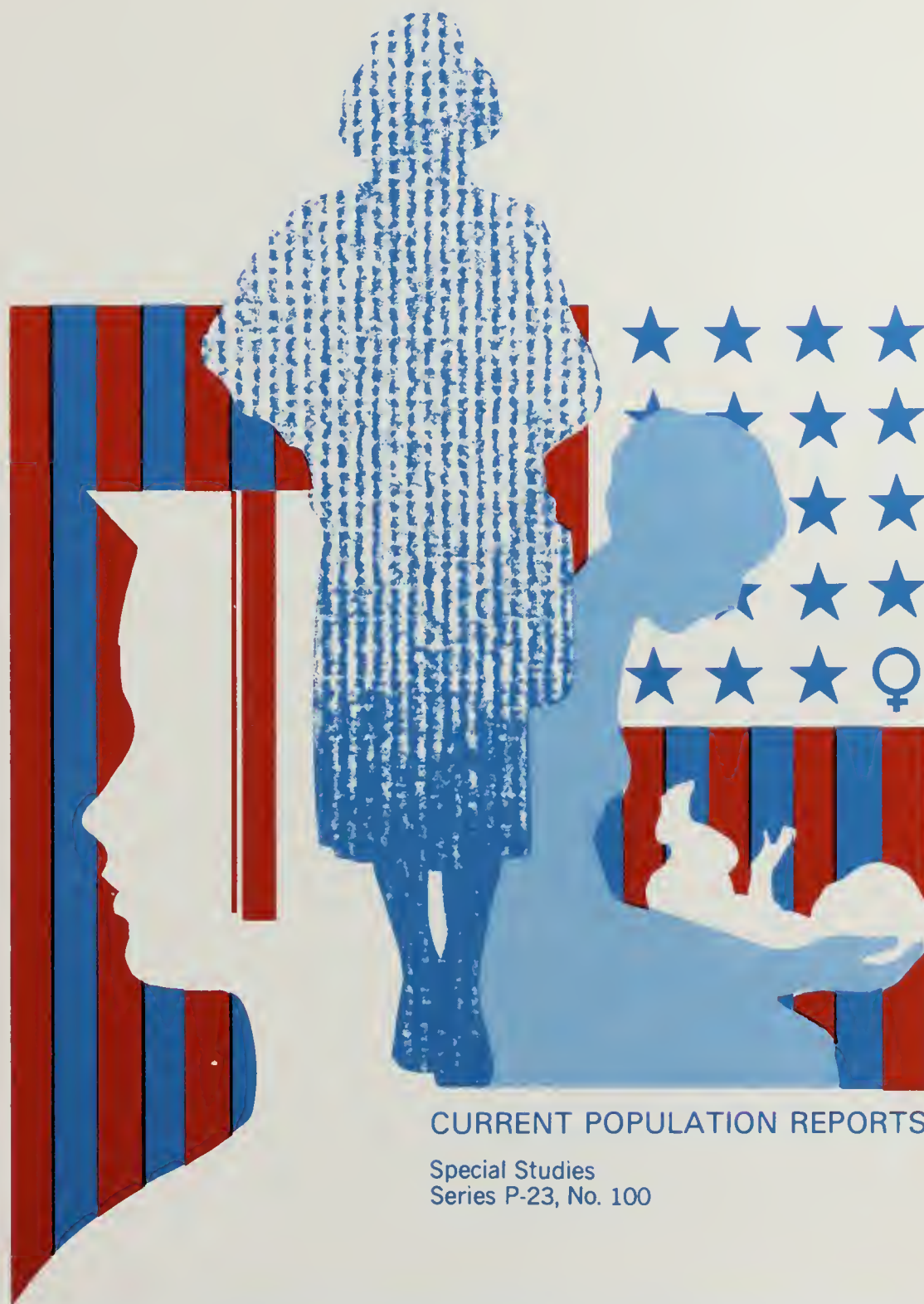
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ACKNOWLEDGMENTS

This report was planned and coordinated in the Population Division by **Karen M. Mills** and **Thomas J. Palumbo**. Contributions to the preparation of specific chapters were made by Celia G. Boertlein, Rosalind R. Bruno, Anita Chiera, Karen A. Crook, Diana DeAre, Carmen DeNavas, Jerry T. Jennings, Patricia A. Johnson, Edith K. McArthur, Louisa F. Miller, Sharon A. Phipps, Carolyn C. Rogers, Arlene F. Saluter, Ruth Sanders, Nancy L. Sweet, Victor M. Valdisera, and Signe I. Wetrogan.

Sampling review was conducted under the supervision of **Diana Harley**, Statistical Methods Division.

In Publications Services Division, the text and tables were edited by **Paula Coupe**, and the publication was designed by **Beverly Jo Jaquish**.

Library of Congress Cataloging in Publication Data

United States. Bureau of the Census.

A statistical portrait of women in the United States,
1978.

(Current population reports: Special studies:
Series P-23; no. 100)

1. Women—United States—Statistics. 2. Women—
United States—Social conditions. I. Title. II
Series: United States. Bureau of the Census. Current
population reports: Special studies: Series P-23;
no. 100.

HA203.A218 no. 100 [HQ1420] 312'.0973s [305.4'0973]
80-6070

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by a draft on a U.S. bank. Current Population Reports are sold in two subscription packages: Series P-20, P-23, P-27, and P-60 are available for \$40.00 per year (\$10 additional for foreign mailing); Series P-25, P-26, and P-28 are available for \$70.00 per year (\$17.50 additional for foreign mailing). The single-copy price of this report \$5.50. Stock No. 003-001-91513-8

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SYMBOLS USED IN TABLES

- Represents zero or rounds to zero.
- NA Not available.
- X Not applicable.
- B Base of the derived figure is less than 75,000.
- S Figure does not meet standards of reliability or precision (i.e., has more than 30-percent relative standard error).

Introduction



This report provides a statistical overview of the changing status of women in American society during the 1970 decade. Data have been compiled primarily from U.S. Government sources: surveys, decennial censuses, vital statistics, and administrative records. While the majority of the statistics have been published previously in Bureau of the Census or other governmental reports, they are assembled here to document the patterns of demographic, social, and economic change that have affected American women in the 1970's. The factors involved in these changes and their interrelationships may have a pervasive influence in shaping the future life situation of American women.

The analyses examine the recent trends (generally from 1970 to 1978) among women in the areas of population growth and distribution, longevity, mortality, health, marital status, living arrangements, housing characteristics, fertility, and education. Other topics include labor force participation, work experience, occupation, industry, women-owned businesses, income, poverty status, voting, public officeholding, and crime and victimization. Attention is focused on the socioeconomic condition of women relative to that of men. Comparisons of Black women with White women are discussed separately, and recent data are included for women of Spanish origin. Separate data are also presented for American Indian women and Asian women.

The statistics in this report update those presented in "A Statistical Portrait of Women in the United States," Current Population Reports, Series P-23, No. 58, April 1976. The earlier report contains historical data relating to women, beginning in 1900 where available.

Highlights

- In July 1978, the female population of the United States was estimated to be about 112.0 million, representing 51.3 percent of the total population and outnumbering males by 5.5 million. By the year 2000, females are projected to outnumber males by 6.7 to 7.6 million.
- Among the 15 leading causes of death, women experienced lower death rates than men during the 1970's from all causes except diabetes. In 1976, the death rate for women from diseases of the heart—the leading cause of death for both sexes—was only about one-half (48 percent) that for men, and the death rate for women from cancer, which ranked second, was about two-thirds (67 percent) that for men.
- Recent trends in marriage and divorce have resulted in a much greater increase of never-married and divorced women than of those married and living with a husband. Between 1970 and 1978, the number of women 25 to 34 years old who had not yet married rose by 111 percent, while the number of women of this age group who were divorced and not remarried increased by 170 percent. Over the same period, the number of women 25 to 34 who were married and living with a husband increased by only 17 percent.
- Since 1970, there has been a greater proportional increase in the number of women maintaining a family with no spouse present (46 percent) than in the number of comparable men (27 percent). At the same time, however, the growth in the number of nonfamily households maintained by men (92 percent) was about twice that of nonfamily households maintained by women (43 percent).
- The fertility of American women has declined during the 1970's, reaching a level even lower than the previous low point recorded during the mid-1930's. By 1970, women 18 to 44 years old had borne an average of 1.9 children per woman, an average that dropped to about 1.6 children per woman in 1978.
- The number of women 16 to 34 years old enrolled in college has risen far more rapidly than the comparable number of men since 1970 (57 percent compared with 16 percent). This expansion of women's college enrollment helped to raise the number of women per 100 men in college from 68 in 1970 to 92 in 1978.
- The changing social and economic roles of women are most evident in the increase in their labor force participation. Between 1970 and 1978, the annual average labor force participation rate for women increased from 43 percent to 50 percent. Women 25 to 34 years old showed an even greater gain, with their rates rising from 45 percent to 62 percent in this time span.
- About 46 million women (nearly 56 percent of all women 16 years and over) had at least some work experience in 1977, compared with approximately 61 million men (about 81 percent of all men 16 years and over). The number of female workers has grown by 20 percent since 1970, while the number of male workers has increased by 11 percent.
- Although employment of women increased during the 1970's, female workers remained concentrated in a few major occupation groups, with over one-half of them working in clerical and service positions.
- The substantial earnings differential between women and men remained unchanged between 1970 and 1977. Women working year round full time had median earnings of \$8,620 in 1977, or 59 percent of that of comparable men (\$14,630); in 1970, such women had median earnings of \$8,310 (in 1977 dollars), which also was 59 percent of that of comparable men (\$13,990).
- Of the 24.7 million persons below the poverty level in 1977, about 58 percent (14.4 million) were women and female children. While women maintained about 14 percent of all families in 1977, they maintained 49 percent of families below the poverty level in that year.
- In the elections since 1968, men have been slightly more likely to vote than women, but because women have outnumbered men of voting age, more votes have been cast by women than men. In the 1978 Congressional election, the largest difference in voting between the sexes was found among persons 65 years old and over.
- For crimes of violence, there were about 5 women for every 10 men victimized in 1977; for crimes of theft, the ratio was about 8 to 10. Since 1970, the rates of arrest for both women and men have increased, and arrests of women have risen slightly as a proportion of all arrests for violent crimes and property crimes.

Chapter 1



Population Growth and Distribution

Population growth. The female population of the United States on July 1, 1978, was estimated to be 112,046,000, a figure 5.5 million larger than the number of males and comprising 51.3 percent of the total population of 218,548,000 (table 1-1). This estimate represents an increase of about 7 percent in the female population since 1970, a growth rate slightly higher than that of the male population (6 percent).

By the year 2000, the female population is projected to range between 127 and 145 million¹ and to continue to comprise about 51 percent of the total population.

Age composition. In 1978, the median age of the female population was 31.0 years, 2.5 years higher than the median age of the male population. Between 1978 and 2000, the median age of both females and males is projected to increase to between 34 and 39 years for females and between 31 and 36 years for males. Some perspective on the present and future age structures of the population is given in table 1-1 and figure 1-1. In 1978, the largest cohorts of females were those aged 15 to 24 (figure 1-1). This age group and the category 25 to 29 years were the only age groups in which there were more females in 1978 than are projected for the year 2000. The size of these cohorts reflects the higher fertility rates of the post-World War II "baby boom," the effects of which can be seen carried through to the year 2000 when these cohorts reach ages 35 to 54.

The proportion of the female population below age 15 has declined steadily since 1970 when 27.1 percent of the female population was under age 15. By 1975, this proportion had dropped to 24.0 percent, and by 1978, it had dropped still further to 22.2 percent. For the male popula-

¹ The population projections are determined by the assumptions made about future fertility, mortality, and net immigration. The three series of projections vary on the basis of the assumed levels of fertility. Series I projections assume that women who enter the childbearing ages in future years will have an average of 2.7 births per woman; Series II and Series III assume averages of 2.1 and 1.7 births, respectively. All projections series use the same assumptions for mortality and net immigration. The assumptions about future mortality reflect the recent decline in the age-specific death rates in the middle and older adult ages. Net immigration is assumed to be 400,000 per year.

tion, the proportions under age 15 were slightly higher than those for females, but the pattern of change was nearly identical. Series III projections have the proportion of the female population below age 15 declining to 19.8 percent by 1985 and to 17.9 percent by 2000. Series II projections have the proportion declining, but less rapidly, to 21.1 percent in 1985 and 20.8 percent in 2000. Under the fertility assumptions of the Series I projections, the proportion of the female population under age 15 would increase to 23.0 percent by 1985 and to 24.7 percent by 2000.

The current and future numbers of women 15 to 44 years old are significant, particularly in connection with the growth of the population, for these are the women in the childbearing ages. In 1970, 40.8 percent of the female population was 15 to 44 years of age. By 1978, this proportion had risen to 44.7 percent. Based on the various projections, between 45.0 and 46.9 percent of the female population will be 15 to 44 years old in 1985. By the year 2000, however, this proportion will have decreased to between 41.0 and 43.0 percent.

Between 1978 and 2000, the largest increases in the female population will be in the age group 65 years and over, which will increase by about 34 percent (4.8 million). This increase is expected because of the increasing number of births through the late 1920's and the past and projected reductions in the age-specific death rates.

Sex ratios. The sex ratio (number of males per 100 females) may be viewed as a good summary measure of the sex composition of the United States (table 1-2). It should be noted, however, that the proportions of females and males as a whole and in various age groups, as shown in the estimates and projections, are also affected by net coverage errors and age reporting errors. In 1978, the sex ratio for the population below age 5 was 105. This relatively greater number of very young males is a consequence of the higher proportion of all births being male. As the population ages, however, the larger numbers of men relative to women begin to diminish because of the higher death rates of men. For the age group 65 and over in 1978, there were only 69 men per 100 women.

Residence and migration. Women and men in the United States exhibit similar residential and migratory patterns; this situation is not surprising as most people marry sometime during their lives, and most married couples move together. Most of the small differences in the residential and migratory behavior of women and men can be attributed to differences in marital status, employment status, life-cycle

stage, or labor market opportunities, which may favor the employment of one sex over the other.

About 67 percent of women and men lived in metropolitan areas in 1978 (table 1-3). Within these areas, the highest proportions of both sexes lived in the suburbs (outside the central cities). The ratio of men to women was higher in the suburbs than in the central cities, particularly among those 45 years and over (table 1-4). The higher representation of women in the central cities, as compared with the suburbs, may be a result of differences in the employment opportunities for women offered by such areas. Cities with a concentration of service industries (e.g., education, health, finance, public administration) generally offer especially favorable employment opportunities for women in professional, clerical, and service occupations.

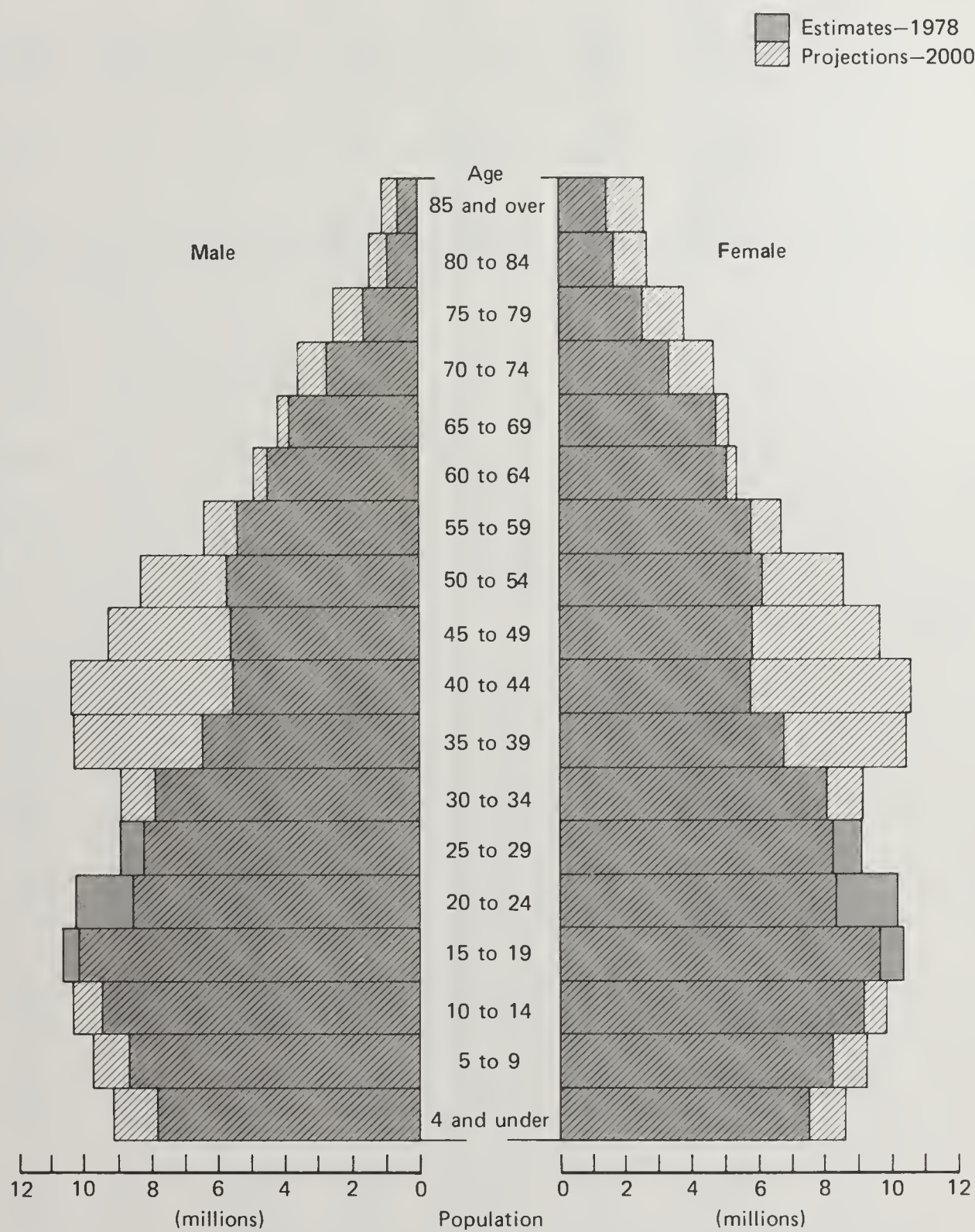
In nonmetropolitan areas, the distribution of women and men in urban and rural-nonfarm areas was about the same as that of the total population. There was a relatively high ratio of men to women in farm areas, particularly among the elderly (65 years and older). The stronger representation of men in the farm population may reflect the predominantly masculine nature of farm work and, at the older ages, a difference in response to the loss of a spouse. A man is more likely to remain on the land and continue farming after the loss of his wife; a woman who loses her husband may instead migrate from the farm or terminate farming operations.

As shown by 1976 CPS data, there appeared to be little overall difference in the 1-year mobility rates between women and men during their lifetimes. However, women had somewhat higher rates of moving than men at ages 16 to 24 years, slightly lower rates from 25 to 44 years, and approximately equal rates for ages 45 years and over (table 1-5). The probability of moving was greatest for women at ages 16 to 24; for men, the peak mobility age range was 25 to 34 years.

The 1976 data indicated that married women were less mobile than married men of the same age until the age of 45, when differences in mobility became insignificant. In fact, the slight differences found in mobility rates between women and men at each age may simply reflect the movement of married couples where the woman is typically a few years younger than her husband. Divorced, widowed, and separated women were, in general, more likely than single or married women of the same age to change their place of residence. (The exceptions are for ages 35 to 44 for single women and 16 to 24 for married women for which the apparent differences in mobility are not statistically significant.)

FIGURE 1-1.
 Estimates and Projections of the Population of the United States,
 by Age and Sex: 1978 and 2000

(Estimates and Series II projections as of July 1,
 including Armed Forces overseas)



Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-25, Nos. 800 and 704.

Table 1-1. Estimates and Projections of the Population of the United States, by Age and Sex: 1970 to 2000

(Numbers in thousands. As of July 1. Total population including Armed Forces overseas. For meaning of symbols, see text)

Sex, year, and series	All ages	Under 5 years	5 to 14 years	15 to 24 years	25 to 44 years	45 to 64 years	65 years and over	Median age
Women:								
1970.....	104,609	8,406	19,980	18,048	24,599	21,896	11,681	29.3
1975.....	109,346	7,765	18,497	19,898	27,238	22,711	13,236	30.0
1978.....	112,046	7,507	17,373	20,511	29,549	22,831	14,276	31.0
1985.....								
Series I.....	122,437	11,161	16,965	19,049	36,036	22,932	16,293	31.1
Series II.....	119,514	9,171	16,032					32.7
Series III.....	117,564	7,919	15,333					33.2
2000.....								
Series I.....	144,746	11,517	24,270	20,972	38,409	30,473	19,105	34.1
Series II.....	133,790	8,699	19,087	18,018				36.8
Series III.....	126,714	6,899	15,786	16,042				38.5
Men:								
1970.....	100,269	8,742	20,754	18,452	23,837	20,079	8,407	26.6
1975.....	104,213	8,114	19,236	20,346	26,497	20,835	9,184	27.6
1978.....	106,502	7,855	18,090	20,986	28,771	21,021	9,778	28.5
1985.....								
Series I.....	116,441	11,726	17,775	19,468	35,198	21,261	11,012	29.5
Series II.....	113,366	9,632	16,794					30.3
Series III.....	111,315	8,315	16,060					30.8
2000.....								
Series I.....	138,091	12,121	25,525	21,684	37,385	28,659	12,717	30.8
Series II.....	126,588	9,153	20,067	18,607				34.1
Series III.....	119,162	7,259	16,593	16,549				36.0
PERCENT DISTRIBUTION								
Women:								
1970.....	100.0	8.0	19.1	17.3	23.5	20.9	11.2	(X)
1975.....	100.0	7.1	16.9	18.2	24.9	20.8	12.1	(X)
1978.....	100.0	6.7	15.5	18.3	26.4	20.4	12.7	(X)
1985.....								
Series I.....	100.0	9.1	13.9	15.6	29.4	18.7	13.3	(X)
Series II.....	100.0	7.7	13.4	15.9	30.2	19.2	13.6	(X)
Series III.....	100.0	6.7	13.0	16.2	30.7	19.5	13.9	(X)
2000.....								
Series I.....	100.0	8.0	16.8	14.5	26.5	21.1	13.2	(X)
Series II.....	100.0	6.5	14.3	13.5	28.7	22.8	14.3	(X)
Series III.....	100.0	5.4	12.5	12.7	30.3	24.0	15.1	(X)
Men:								
1970.....	100.0	8.7	20.7	18.4	23.8	20.0	8.4	(X)
1975.....	100.0	7.8	18.5	19.5	25.4	20.0	8.8	(X)
1978.....	100.0	7.4	17.0	19.7	27.0	19.7	9.2	(X)
1985.....								
Series I.....	100.0	10.1	15.3	16.7	30.2	18.3	9.5	(X)
Series II.....	100.0	8.5	14.8	17.2	31.0	18.8	9.7	(X)
Series III.....	100.0	7.5	14.4	17.5	31.6	19.1	9.9	(X)
2000.....								
Series I.....	100.0	8.8	18.5	15.7	27.1	20.8	9.2	(X)
Series II.....	100.0	7.2	15.9	14.7	29.5	22.6	10.0	(X)
Series III.....	100.0	6.1	13.9	13.9	31.4	24.1	10.7	(X)

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-25, Nos. 800, 721, and 704.

Table 1-2. Estimates and Projections of the Sex Ratios of the Population, by Age: 1970 to 2000

(Number of males per 100 females. As of July 1. Total population including Armed Forces overseas)

Year and series	All ages	Under 5 years	5 to 14 years	15 to 24 years	25 to 44 years	45 to 64 years	65 years and over
1970.....	95.9	104.0	103.9	102.2	96.9	91.7	72.0
1975.....	95.3	104.5	104.0	102.3	97.3	91.7	69.4
1978.....	95.1	104.6	104.1	102.3	97.4	92.1	68.5
1985.....							
Series I.....	95.1	105.1	104.8	102.2	97.7	92.7	67.6
Series II.....	94.9	105.0	104.8				
Series III.....	94.7	105.0	104.7				
2000							
Series I.....	95.4	105.2	105.2	103.4	97.3	94.0	66.6
Series II.....	94.6	105.2	105.1	103.3			
Series III.....	94.0	105.2	105.1	103.2			

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-25, Nos. 800, 721, and 704.

**Table 1-3. Percent Distribution of the Population, by Metropolitan-Nonmetropolitan Residence, Sex, and Age:
1978 and 1970**

(Civilian noninstitutional population. Five-quarter averages centered on April)

Year, sex, and age	United States (thousands)	Percent	Metropolitan areas (SMSA's) ¹			Nonmetropolitan areas		
			Total	In central cities ²	Outside central cities	Total	Urban and rural nonfarm	Rural farm
1978								
Women, all ages.....	110,465	100.0	67.3	28.6	38.6	32.7	29.9	2.8
Under 14 years.....	22,949	100.0	65.6	26.8	38.8	34.4	31.6	2.8
14 to 19 years.....	12,303	100.0	66.8	26.7	40.1	33.2	29.8	3.4
20 to 24 years.....	10,008	100.0	70.2	32.0	38.2	29.8	27.9	1.9
25 to 34 years.....	16,894	100.0	69.6	29.3	40.3	30.4	28.6	1.8
35 to 44 years.....	12,318	100.0	68.2	26.6	41.6	31.8	28.7	3.0
45 to 64 years.....	22,666	100.0	67.7	29.2	38.5	32.3	28.8	3.5
65 years and over.....	13,328	100.0	63.6	31.1	32.6	36.4	33.3	3.0
Men, all ages.....	103,002	100.0	66.7	27.3	39.5	33.3	30.0	3.2
Under 14 years.....	23,911	100.0	65.3	26.3	39.0	34.7	31.9	2.8
14 to 19 years.....	12,338	100.0	66.3	25.8	40.3	33.7	29.8	3.9
20 to 24 years.....	9,341	100.0	69.1	30.2	38.9	30.9	28.4	2.5
25 to 34 years.....	15,936	100.0	69.5	28.9	40.7	30.5	28.5	2.0
35 to 44 years.....	11,398	100.0	67.3	25.1	42.2	32.7	29.5	3.3
45 to 64 years.....	20,727	100.0	67.6	27.3	40.3	32.4	28.4	4.0
65 years and over.....	9,352	100.0	61.3	28.5	32.8	38.7	34.1	4.6
1970								
Women, all ages.....	103,286	100.0	65.2	29.6	35.6	34.8	30.8	4.1
Under 14 years.....	26,899	100.0	64.2	27.2	37.1	35.8	31.8	4.0
14 to 19 years.....	11,247	100.0	63.9	27.5	36.4	36.1	31.3	4.8
20 to 24 years.....	8,380	100.0	68.0	33.1	34.9	32.0	29.5	2.4
25 to 34 years.....	12,601	100.0	66.9	28.9	38.0	33.1	30.3	2.8
35 to 44 years.....	11,707	100.0	66.7	27.7	39.0	33.3	29.1	4.2
45 to 64 years.....	21,595	100.0	65.4	31.4	34.0	34.6	29.6	5.0
65 years and over.....	10,856	100.0	62.4	34.3	28.1	37.6	33.3	4.3
Men, all ages.....	95,950	100.0	64.4	28.2	36.1	35.6	31.0	4.7
Under 14 years.....	27,972	100.0	63.7	26.6	37.1	36.3	32.3	4.1
14 to 19 years.....	11,111	100.0	62.8	26.2	36.6	37.2	31.5	5.7
20 to 24 years.....	6,728	100.0	67.6	32.9	34.7	32.4	28.9	3.6
25 to 34 years.....	11,644	100.0	66.8	28.9	37.9	33.2	30.3	2.8
35 to 44 years.....	10,825	100.0	66.3	27.0	39.3	33.7	29.5	4.2
45 to 64 years.....	19,600	100.0	64.8	29.4	35.4	35.2	29.4	5.8
65 years and over.....	8,069	100.0	59.2	30.9	28.2	40.8	34.2	6.6

¹Population of the 243 standard metropolitan statistical areas (SMSA's) as defined in 1970 census publications.

²Data for central cities refer to their January 1, 1970, boundaries and exclude areas annexed since 1970.

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 and 1970 Current Population Survey data.

Table 1-4. Sex Ratios, by Metropolitan-Nonmetropolitan Residence and Age: 1978 and 1970

Number of males per 100 females. Civilian noninstitutional population. Five-quarter averages centered on April)

On April 17,

Year and age	United States	Metropolitan areas (SMSA's) ¹			Nonmetropolitan areas		
		Total	In central cities ²	Outside central cities	Total	Urban and rural nonfarm	Rural farm
1978							
All ages.....	93.2	92.5	88.8	95.3	94.7	93.6	106.4
Under 14 years.....	104.2	103.7	102.3	104.7	105.1	105.1	105.1
14 to 19 years.....	100.3	99.5	96.8	101.3	101.9	100.5	113.5
20 to 24 years.....	93.3	91.9	88.0	95.1	96.8	95.0	121.5
25 to 34 years.....	94.3	94.2	92.9	95.2	94.6	94.1	102.3
35 to 44 years.....	92.5	91.2	87.3	93.7	95.4	94.9	99.5
45 to 64 years.....	91.4	91.3	85.5	95.8	91.7	90.0	105.4
65 years and over.....	70.2	67.6	64.4	70.7	74.7	71.8	105.7
1970							
All ages.....	92.9	91.8	88.6	94.4	95.0	93.5	106.1
Under 14 years.....	104.0	103.1	101.7	104.1	105.6	105.7	104.9
14 to 19 years.....	98.8	97.1	94.1	99.3	101.8	99.4	117.6
20 to 24 years.....	80.3	79.7	79.8	79.7	81.4	78.5	117.2
25 to 34 years.....	92.4	92.3	92.5	92.1	92.5	92.5	93.5
35 to 44 years.....	92.5	91.9	90.0	93.2	93.6	93.7	93.7
45 to 64 years.....	90.8	90.0	84.8	94.7	92.3	90.0	105.5
65 years and over.....	74.3	70.5	67.0	74.7	80.8	76.4	114.6

¹Population of the 243 standard metropolitan statistical areas (SMSA's) as defined in 1970 census publications.

²Data for central cities refer to their January 1, 1970, boundaries and exclude areas annexed since 1970.

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 and 1970 Current Population Survey data.

Table 1-5. Mobility Status, by Age, Sex, and Marital Status: 1975 to 1976

(Movers as percent of population within specified group. Noninstitutional population 16 years and over excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Mobility status, sex, and marital status	Total, 16 years and over	16 to 24 years	25 to 34 years	35 to 44 years	45 to 64 years	65 years and over
TOTAL MOVERS						
Women, total.....	17.0	31.7	25.8	12.4	7.7	5.8
Never married.....	19.1	19.7	29.7	16.5	6.8	3.2
Married, spouse present.....	16.3	51.2	23.1	10.4	6.3	3.9
Other marital status ¹	16.9	56.9	37.0	21.0	12.6	7.2
Men, total.....	18.1	27.2	30.0	15.4	8.3	5.5
Never married.....	19.5	18.8	29.6	17.3	8.2	4.8
Married, spouse present.....	16.3	58.2	28.0	13.2	7.0	4.6
Other marital status ¹	26.6	48.3	48.8	34.6	18.7	9.6
MOVERS WITHIN SAME COUNTY						
Women, total.....	10.4	19.5	15.9	7.2	4.7	3.7
Never married.....	11.4	11.4	18.8	10.3	5.1	2.4
Married, spouse present.....	9.6	32.3	13.7	5.4	3.3	2.2
Other marital status ¹	11.7	37.2	25.7	15.2	9.1	4.7
Men, total.....	10.8	15.9	18.7	9.0	4.7	3.3
Never married.....	11.1	10.3	17.6	11.8	5.4	3.3
Married, spouse present.....	9.8	36.7	17.5	7.2	3.8	2.6
Other marital status ¹	16.8	27.5	31.2	23.8	11.4	6.1
MOVERS TO DIFFERENT COUNTY, SAME STATE						
Women, total.....	3.3	6.3	5.1	2.4	1.5	1.1
Never married.....	4.1	4.5	5.9	4.3	0.6	0.2
Married, spouse present.....	3.3	9.3	4.8	2.1	1.5	0.9
Other marital status ¹	2.7	9.5	6.0	3.3	1.8	1.3
Men, total.....	3.5	5.3	5.8	2.7	1.8	1.2
Never married.....	3.9	3.9	5.5	3.7	1.2	1.0
Married, spouse present.....	3.3	10.8	5.6	2.5	1.6	1.1
Other marital status ¹	4.5	8.0	8.8	4.4	3.7	1.5
MOVERS TO DIFFERENT STATE						
Women, total.....	2.8	5.0	4.3	2.3	1.3	0.9
Never married.....	2.9	3.0	4.6	0.9	1.0	0.4
Married, spouse present.....	2.9	8.2	4.1	2.4	1.3	0.7
Other marital status ¹	2.3	9.1	5.2	2.2	1.4	1.1
Men, total.....	3.1	4.8	4.5	3.1	1.5	1.0
Never married.....	3.5	3.5	5.3	1.8	1.2	-
Married, spouse present.....	2.7	9.2	3.9	3.0	1.3	0.8
Other marital status ¹	4.8	11.5	7.8	5.8	3.3	2.0

¹Includes widowed, divorced, and married, spouse absent.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 305.

Chapter 2



Longevity, Mortality, and Health

Life expectancy. Progress in achieving greater longevity may be shown by changes in life expectancy at birth, a measure which represents the average number of years a newborn child may expect to live according to the death rates for a given year or period.

The difference between women and men in life expectancy at birth has remained constant in the 1970's (table 2-1). In 1976, as in 1970, women could expect to live 7.7 years longer, on the average, than men, because both sexes recorded a gain of 1.9 years in their average length of life over the 6-year period. Life expectancy for women rose from 74.8 years in 1970 to 76.7 years in 1976, while life expectancy for men rose from 67.1 to 69.0 years. In the year 2000, according to Bureau of the Census projections, the life expectancy at birth of females (78.3 years) would exceed that of males (70.0 years) by 8.3 years.

The sex differential in remaining years of life expected at age 65 has widened since 1970, and projections indicate that it will continue to do so. In 1976, women who had reached age 65 had an additional 18.0 years of life remaining, on the average, compared with 13.7 years remaining for men of the same age—a difference of 4.3 years. Women 65 years old could expect to live an average of 3.9 years longer than men of the corresponding age in 1970; by 2000, women 65 years of age are expected to outlive their male counterparts by 4.9 years.

Mortality. Although the age-adjusted mortality rate for women dropped 13 percent between 1970 and 1976, the sex mortality ratio (i.e., the ratio of female to male mortality) remained relatively unchanged (table 2-2). In both years, the age-adjusted female death rate was only about 56 percent of the male death rate.

During the 1970's, women have had lower death rates than men for 14 of the 15 leading causes of death (for both sexes combined). Only for diabetes mellitus has female mortality exceeded male mortality. Even for this cause, the slight male advantage recorded in 1970 has diminished, as reflected in the decline in the female-male mortality ratio from 1.07 in 1970 to 1.02 in 1976.

In 1976, the death rate for women from diseases of the heart, the leading cause of death for both sexes, was only about one-half (48 percent) that for men, and the death rate for women from malignant neoplasms (cancer), which ranked second, was about two-thirds (67 percent) that for men.

Cancer and homicide are the only leading causes of death which have increased for women since 1970 (0.6 percent and 11 percent, respectively). In 1976, men continued to have a mortality rate from homicide almost four times as high as that of women. Mortality rates for women from the other two external causes of death—accidents and suicide—were approximately 35 percent of those for men in 1976.

Acute conditions. In both 1970 and 1977, women experienced more acute illnesses and injuries than men (table 2-3). After controlling for differences in the age distributions, women reported that they were subject to about 29 more acute conditions per 100 persons in 1977 than men (237 conditions per 100 women compared with 208 conditions per 100 men). For each age group 17 years and over, women had higher incidence rates of acute conditions than men in 1977 and, for both sexes, the rates diminished with age.

Considering the five categories of acute conditions, women had higher age-adjusted incidence rates than men in 1977 for infective and parasitic diseases, respiratory conditions, and for the residual "all other" category even when deliveries and disorders of pregnancy were excluded. Only for injuries did men have higher incidence rates than women; the rates for conditions of the digestive system were nearly identical for women and men.

Limitation of activity. Although women and men were equally likely in 1976 to report some limitation of their activities because of chronic disease or impairment, women were much less likely than men to report that they were unable to carry on the *major* activity of their age-sex group, such as working, keeping house, or engaging in school or preschool activities (table 2-4). Overall, 14 percent of persons of both sexes were limited in activity to some degree as a direct result of one or more chronic conditions; however, only about 2 percent of women, as compared with approximately 5 percent of men, were no longer able to perform what was considered to be their major activity.

For both sexes, the proportions of persons with any limitation of activity, as well as the proportions of those who were unable to carry on their major activity because of a chronic condition, rose with advancing age, reflecting the increased frequency, complexity, and chronicity of conditions associated with aging.

For each age group in 1976, men were more likely than women to be unable to pursue their major activity because of chronic conditions, and, as age increased, the discrepancy between the sexes widened. Inability to perform major activity was reported by 1.0 percent of men and 0.4 percent

of women under 45 years old; among persons 65 years and over, 30 percent of men were unable to carry on their major activity, compared with 9 percent of women.

The reported differences between women and men with regard to inability to carry on major activity from a chronic condition may reflect, in part, sex differentials in occupational roles and, also, the classification procedure of the Health Interview Survey (HIS). Men may have more strenuous or hazardous occupations than women, so that a given chronic condition may cause men to curtail their job performance more often than women. In addition, the HIS, on which these data are based, classifies persons as unable to carry on their major activity according to their age-sex group, for example, if housewives cannot do housework, or if workers (women or men) cannot work at a job or business. Thus, women, especially those at the older ages when the sex differentials are greatest, may be more able to alter their major activity status (for example, from employed worker to housewife) to accommodate a chronic condition.

Among women with activity limitation in 1976, arthritis and rheumatism ranked as the leading chronic condition causing limitation of activity, followed by heart conditions and hypertension. Heart conditions, arthritis and rheumatism, and impairments (except paralysis) of back or spine were the three leading chronic conditions causing activity limitation among men.

Disability. Several measures of disability which are used to describe how acute and chronic conditions affect the ordinary activities of women and men are presented in table 2-5 and figure 2-1.¹ These data indicate that women had more restricted-activity days, bed-disability days, and work-loss days than men in 1977. Specifically, women reported 19.6 days of restricted activity per person during the year as a result of acute or chronic illness. Included in these 19.6 days were an average of 7.9 days spent in bed. In contrast, men reported 15.8 restricted-activity days and 5.8 bed-disability days per person. Currently employed women 17 years old and over lost 5.3 days per person from work because of illness or injury in 1977, compared with an average work loss of 4.7 days for their male coworkers.

Utilization of medical and dental services. In 1977, women made 1.2 more physician visits per person per year than men (5.4 versus 4.2 visits) (table 2-6). For persons 17 to 64 years old, women had a higher frequency of physician consultations than did men; for the younger and older age groups

¹ For the Health Interview Survey, on which the disability data are based, a day of restricted activity is defined as one during which a person substantially reduces his or her usual activities for the whole day because of illness or injury. Each day spent in bed for all or most of the day is also counted as a day of restricted activity. Similarly, a work-loss day, one in which a person did not work at his or her job or business for at least one-half the normal workday because of an illness or injury, is also considered a day of restricted activity.

(under age 17 and 65 years and over), the average number of physician visits were similar for both sexes.

The largest differentials between the sexes in number of physician visits in 1977 were for the age categories between 17 and 44 years. Women made about 87 percent more physician visits than men at ages 17 to 24 and 66 percent more visits at ages 25 to 44. This disparity declined with increasing age, so that for the age group 65 years and over, the number of physician visits was only about 3 percent higher for women. Because the major age-sex differences occurred approximately during the childbearing ages for women, it is

likely that a large proportion of the higher number of visits for women can be attributed to pregnancy and associated conditions.

Women and men alike averaged fewer dental visits per year in 1977 than physician visits. The number of dental visits per person per year in 1977 was slightly higher for women (1.7 visits) than for men (1.5 visits).

A larger proportion of women than men visited a physician at least once in 1977 (89 versus 83 percent), and women had a slightly higher proportion than men with at least one dental visit during the year (64 versus 62 percent).

FIGURE 2-1.

Mean Days of Disability Per Person, by Type of Disability, Sex, and Age: 1977

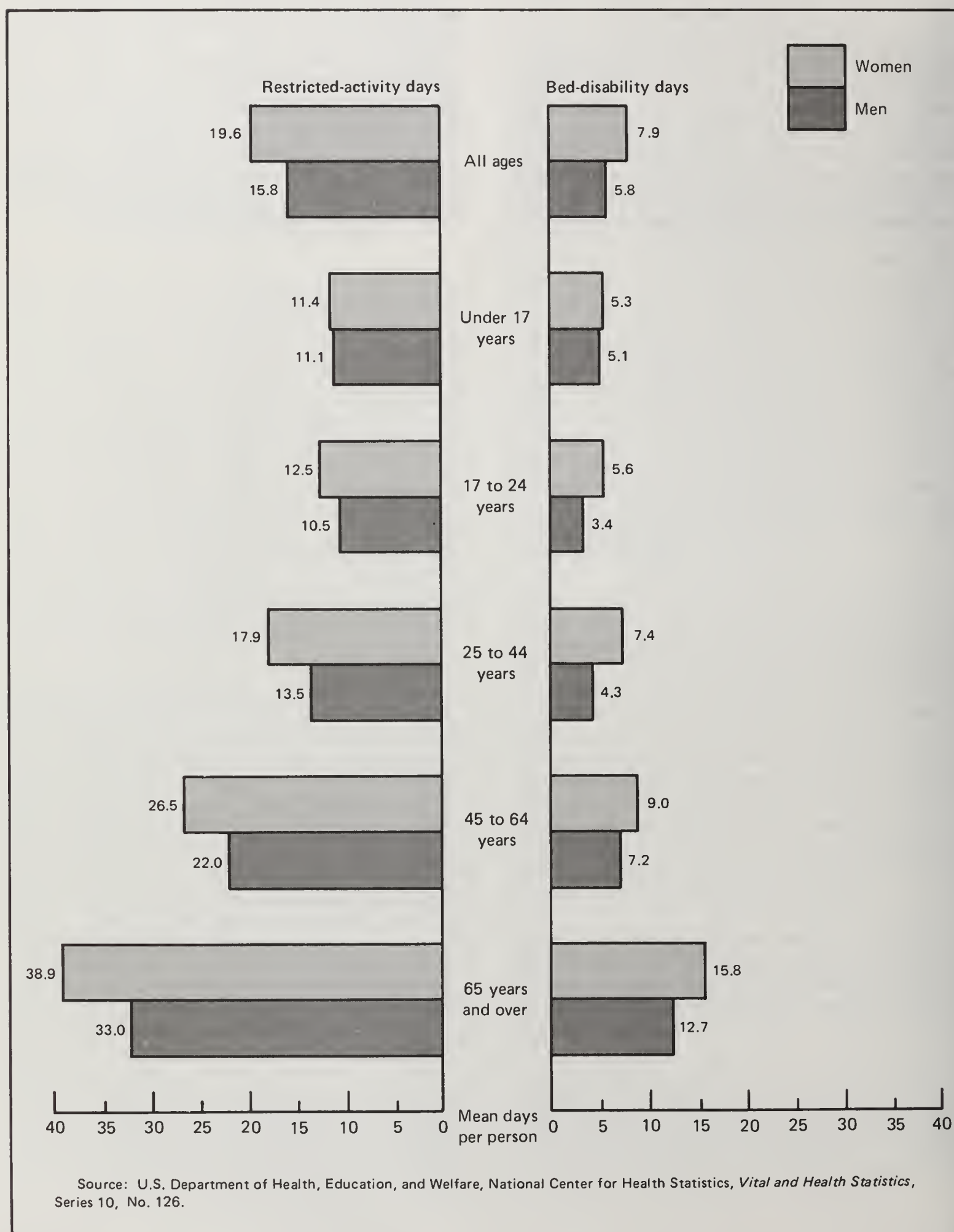


Table 2-1. Life Expectancy at Selected Ages, by Sex: 1970 to 2000

(Additional years of life expected)

Year and sex	At birth	1 year	15 years	25 years	45 years	65 years
2000 ¹						
Women.....	78.3	78.2	64.5	54.8	35.9	19.1
Men.....	70.0	70.0	56.4	47.3	29.2	14.2
Difference (years).....	8.3	8.2	8.1	7.5	6.7	4.9
1976						
Women.....	76.7	76.7	63.1	53.4	34.5	18.0
Men.....	69.0	69.2	55.7	46.5	28.4	13.7
Difference (years).....	7.7	7.5	7.4	6.9	6.1	4.3
1974						
Women.....	75.9	76.0	62.4	52.7	33.9	17.5
Men.....	68.2	68.5	55.0	45.9	27.9	13.4
Difference (years).....	7.7	7.5	7.4	6.8	6.0	4.1
1972						
Women.....	75.1	75.3	61.7	52.1	33.4	17.0
Men.....	67.4	67.8	54.3	45.3	27.3	13.1
Difference (years).....	7.7	7.5	7.4	6.8	6.1	3.9
1970						
Women.....	74.8	75.1	61.6	51.9	33.3	17.0
Men.....	67.1	67.7	54.2	45.2	27.3	13.1
Difference (years).....	7.7	7.4	7.4	6.7	6.0	3.9

¹Estimates for 2000 are based on a linear interpolation of the 1976 and 2050 estimates used in the national population projections developed by the Bureau of the Census.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-25, No. 704, and unpublished data; U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Monthly Vital Statistics Report, Vol. 26, No. 12, and Vol. 24, No. 11; and Vital Statistics of the United States, 1972 and 1970, Vol. II, "Mortality."

Table 2-2. Age-Adjusted Female Death Rates and Sex Mortality Ratios for the 15 Leading Causes of Death: 1970 to 1976

(Refers only to resident deaths occurring within the United States. Excludes fetal deaths. Based on age-specific death rates per 100,000 estimated midyear population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940. Leading causes of death are for the total population as of 1976)

Cause of death	1976	1974	1972	1970
ALL CAUSES				
Female age-adjusted rate.....	462.9	492.9	520.0	532.5
Age-adjusted ratio: women/men ¹	0.56	0.56	0.56	0.57
LEADING CAUSES				
Diseases of the heart.....	147.1	159.2	171.6	175.2
Ratio: women/men ¹	0.48	0.49	0.50	0.50
Malignant neoplasms.....	109.4	109.2	108.8	108.8
Ratio: women/men ¹	0.67	0.67	0.68	0.69
Cerebrovascular diseases.....	47.3	54.9	59.1	60.8
Ratio: women/men ¹	0.83	0.83	0.81	0.83
Accidents.....	22.7	23.8	28.0	28.2
Ratio: women/men ¹	0.35	0.34	0.36	0.35
Influenza and pneumonia.....	13.2	12.8	15.6	16.7
Ratio: women/men ¹	0.57	0.57	0.57	0.58
Diabetes mellitus.....	11.1	12.7	13.9	14.4
Ratio: women/men ¹	1.02	1.04	1.05	1.07
Cirrhosis of the liver.....	8.7	9.7	9.6	9.8
Ratio: women/men ¹	0.46	0.47	0.46	0.49
Arteriosclerosis.....	5.8	6.9	7.4	7.5
Ratio: women/men ¹	0.79	0.80	0.80	0.79
Suicide.....	6.6	6.7	6.9	6.8
Ratio: women/men ¹	0.36	0.37	0.39	0.39
Certain causes of mortality in early infancy...	11.0	12.6	13.4	16.1
Ratio: women/men ¹	0.79	0.76	0.74	0.74
Bronchitis, emphysema, and asthma.....	4.0	4.3	4.8	4.8
Ratio: women/men ¹	0.30	0.27	0.25	0.24
Homicide.....	4.1	4.6	4.0	3.7
Ratio: women/men ¹	0.27	0.27	0.24	0.25
Congenital anomalies.....	6.1	6.2	6.4	7.2
Ratio: women/men ¹	0.91	0.86	0.88	0.90
Nephritis and nephrosis.....	2.3	2.4	2.6	2.9
Ratio: women/men ¹	0.66	0.69	0.67	0.67
Peptic ulcer.....	1.3	1.5	1.6	1.9
Ratio: women/men ¹	0.42	0.42	0.36	0.39

¹Ratio of age-adjusted rates.

Source: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Monthly Vital Statistics Report, Vol. 26, No. 12, and Vol. 24, No. 11; Vital Statistics of the United States, 1972 and 1970, Vol. II, "Mortality"; and unpublished 1974, 1972, and 1970 National Center for Health Statistics data.

Table 2-3. Incidence Rates for Acute Conditions, by Type of Condition, Age, and Sex: 1977 and 1970

(Numbers in thousands. Rate is number of conditions per 100 persons in specified group. Excludes conditions involving neither restricted activity nor medical attention. Civilian noninstitutional population. For meaning of symbols, see text)

Sex and selected condition	1977				
	All ages		Under 17 years	17 to 44 years	45 years and over
	Age adjusted ¹	Unadjusted			
Total women.....	(X)	109,374	29,592	44,187	35,594
Rate for--					
All acute conditions.....	236.6	228.4	324.9	234.9	140.2
Infective and parasitic diseases.....	30.9	29.2	48.9	26.8	15.9
Respiratory conditions.....	119.0	114.2	170.4	114.5	67.0
Digestive system conditions.....	12.7	12.2	18.3	12.0	7.3
Injuries.....	29.1	28.9	31.8	31.4	23.2
All other acute conditions.....	44.9	44.0	55.6	50.1	26.8
Deliveries and disorders of pregnancy and the puerperium.....	3.5	3.8	0.3	9.3	-
Total men.....	(X)	101,988	30,780	41,461	29,747
Rate for--					
All acute conditions.....	208.4	205.5	305.5	196.0	115.1
Infective and parasitic diseases.....	26.5	25.6	48.5	19.2	10.9
Respiratory conditions.....	104.8	103.3	151.8	98.8	59.5
Digestive system conditions.....	12.0	11.7	19.0	9.8	6.9
Injuries.....	39.9	40.3	47.5	49.3	20.2
All other acute conditions.....	25.1	24.5	38.5	18.9	17.6
Sex and selected condition	1970				
	All ages		Under 17 years	17 to 44 years	45 years and over
	Age adjusted ¹	Unadjusted			
Total women.....	(X)	102,993	32,793	37,904	32,297
Rate for--					
All acute conditions.....	214.4	212.2	289.3	208.6	138.0
Infective and parasitic diseases.....	24.9	24.3	42.2	22.0	9.0
Respiratory conditions.....	119.9	118.5	167.6	111.9	76.3
Digestive system conditions.....	11.9	11.8	15.7	11.9	7.7
Injuries.....	22.3	22.3	24.2	22.5	20.0
All other acute conditions.....	35.5	35.3	39.6	40.4	25.0
Deliveries and disorders of pregnancy and the puerperium.....	(NA)	3.3	(NA)	(NA)	(NA)
Total men.....	(X)	95,555	33,967	34,004	27,584
Rate for--					
All acute conditions.....	193.8	196.9	291.3	176.0	106.4
Infective and parasitic diseases.....	23.9	24.6	44.7	17.0	9.1
Respiratory conditions.....	105.4	107.1	157.9	97.3	56.7
Digestive system conditions.....	10.1	10.2	13.8	9.9	6.3
Injuries.....	33.2	33.5	42.4	35.0	20.7
All other acute conditions.....	21.2	21.5	32.5	16.9	13.6

¹Age-adjusted by the direct method to the total 1970 civilian noninstitutional population.

Source: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Vital and Health Statistics, Series 10, Nos. 125 and 77; and unpublished 1977 Health Interview Survey data.

Table 2-4. Persons With Limitation of Activity Due to Chronic Conditions and the Four Leading Chronic Conditions Causing Limitation, by Age and Sex: 1976

(Numbers in thousands. Civilian noninstitutional population)

Limitation of activity, chronic condition, and sex	All ages	Under 45 years	45 to 64 years	65 years and over
LIMITATION OF ACTIVITY				
Total women.....	109,018	73,562	22,620	12,837
With limitation of activity.....	15,611	4,722	5,323	5,566
Percent of total.....	14.3	6.4	23.5	43.4
Unable to carry on major activity ¹	2,011	330	524	1,157
Percent of total.....	1.8	0.4	2.3	9.0
Total men.....	101,626	72,030	20,633	8,962
With limitation of activity.....	14,565	5,056	5,182	4,326
Percent of total.....	14.3	7.0	25.1	48.3
Unable to carry on major activity ¹	5,458	737	2,045	2,676
Percent of total.....	5.4	1.0	9.9	29.9
LEADING CHRONIC CONDITIONS CAUSING LIMITATION				
Women with limitation of activity.....	15,611	4,722	5,323	5,566
Percent with--				
Arthritis and rheumatism.....	21.7	7.4	24.2	31.6
Heart conditions.....	14.8	5.0	15.9	22.0
Hypertension without heart involvement.....	8.9	3.6	11.1	11.1
Impairments (except paralysis) of back or spine..	7.9	12.6	7.9	3.8
Men with limitation of activity.....	14,565	5,056	5,182	4,326
Percent with--				
Heart conditions.....	16.7	3.6	22.2	25.3
Arthritis and rheumatism.....	11.4	3.7	14.9	16.3
Impairments (except paralysis) of back or spine..	7.2	10.3	8.0	2.7
Impairments (except paralysis or absence) of lower extremities and hips.....	6.7	9.5	6.3	4.0

¹Major activity refers to ability to work, keep house, or engage in school or preschool activities.

Source: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Vital and Health Statistics, Series 10, No. 119; and unpublished 1976 Health Interview Survey data.

Table 2-5. Mean Days of Disability Per Person, by Type of Disability, Sex, and Age: 1977

(Civilian noninstitutional population. For meaning of symbols, see text)

Sex and age	Total persons (thousands)	Restricted- activity days per person	Bed-disability days per person	Work-loss days per person ¹
Women, all ages.....	109,769	19.6	7.9	5.3
Under 17 years.....	29,362	11.4	5.3	(X)
17 to 24 years.....	16,107	12.5	5.6	4.5
25 to 44 years.....	28,573	17.9	7.4	5.2
45 to 64 years.....	22,657	26.5	9.0	6.4
65 years and over.....	13,070	38.9	15.8	(S)
Men, all ages.....	102,384	15.8	5.8	4.7
Under 17 years.....	30,547	11.1	5.1	(X)
17 to 24 years.....	15,233	10.5	3.4	4.1
25 to 44 years.....	26,707	13.5	4.3	4.4
45 to 64 years.....	20,700	22.0	7.2	5.5
65 years and over.....	9,197	33.0	12.7	5.0

S Figure does not meet standards of reliability or precision (has more than 30-percent relative standard error).

¹Work-loss days reported for currently employed persons 17 years old and over.

Source: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Vital and Health Statistics, Series 10, No. 126.

Table 2-6. Time Interval Since Last Physician and Dental Visit, and Visits Per Person Per Year, by Sex and Age: 1977

(Civilian noninstitutional population)

Type of visit, sex, and age	Total persons ¹ (thousands)	Time interval since last visit				Average visits per person per year
		Total	Under 6 months	6 months to 1 year	Over 1 year	
PHYSICIAN VISIT						
Women, all ages.....	109,769	100.0	63.5	25.6	10.1	5.4
Under 17 years.....	29,362	100.0	56.5	32.0	10.3	4.0
17 to 24 years.....	16,107	100.0	67.1	25.0	7.1	5.6
25 to 44 years.....	28,573	100.0	64.9	26.3	8.2	5.8
45 to 64 years.....	22,657	100.0	63.6	22.5	13.2	5.9
65 years and over.....	13,070	100.0	71.4	16.0	12.2	6.6
Men, all ages.....	102,384	100.0	53.6	29.6	15.6	4.2
Under 17 years.....	30,547	100.0	57.2	31.8	9.8	4.2
17 to 24 years.....	15,233	100.0	47.7	33.7	16.9	3.0
25 to 44 years.....	26,707	100.0	46.5	32.7	19.5	3.5
45 to 64 years.....	20,700	100.0	55.5	25.0	18.6	4.8
65 years and over.....	9,197	100.0	67.9	16.5	14.8	6.4
DENTAL VISIT						
Women, all ages.....	109,769	100.0	36.9	27.1	26.4	1.7
Under 17 years.....	29,362	100.0	37.2	25.0	7.5	1.6
17 to 24 years.....	16,107	100.0	41.2	34.5	20.4	1.9
25 to 44 years.....	28,573	100.0	39.9	32.5	25.8	1.8
45 to 64 years.....	22,657	100.0	37.2	24.3	37.2	1.9
65 years and over.....	13,070	100.0	24.1	15.8	58.9	1.3
Men, all ages.....	102,384	100.0	34.3	27.3	27.2	1.5
Under 17 years.....	30,547	100.0	36.1	25.0	8.8	1.4
17 to 24 years.....	15,233	100.0	34.2	35.4	24.4	1.4
25 to 44 years.....	26,707	100.0	35.5	31.4	30.3	1.6
45 to 64 years.....	20,700	100.0	35.3	24.6	38.1	1.6
65 years and over.....	9,197	100.0	22.8	15.6	59.9	1.3

¹Includes the small number of persons who reported that they had never visited a physician or dentist or that the timing of the last visit was unknown, not shown separately.

Source: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Vital and Health Statistics, Series 10, No. 126.

Chapter 3



Marital Status, Living Arrangements, and Housing Characteristics

Marital status. The statistics on the marital status and living arrangements of women reflect the current trend toward "singleness" (those persons not currently married). The 3-year average divorce rate has been climbing steadily during the last decade, while the rates of first marriage and remarriage have been falling (table 3-1). Between 1970 and 1978, the estimated median age at first marriage increased by 1 full year for both women and men, from 20.8 to 21.8 years for women and from 23.2 to 24.2 years for men (table 3-2). Although most people do marry eventually, the urgency to marry at prescribed ages is not so strong as in the past. As young adults, women apparently are placing more importance than formerly on pursuing an education, establishing a career, and becoming economically independent before marrying, or instead of marrying at all.

A comparison of the marital status of women 14 years old and over in 1970 with women of the same age in 1978 shows that there was a much greater increase of never-married and divorced women than of those married and living with a husband (table 3-3). The number of women 25 to 34 years old who had not yet married rose by 111 percent between 1970 and 1978, but the number of women 35 years and over who had not married showed no significant change. The number of currently divorced women increased markedly in every age group, particularly for those age 25 to 34 (170 percent). Meanwhile, the number of women 25 to 34 who were married and living with a husband increased by only 17 percent. Much of the large increase in never-married and divorced women in this age group is a consequence of the baby boom as well as changes in marital life styles. Likewise, men have shown a substantial increase in the number divorced and never married.

The liberalization of divorce laws and a growing societal acceptance of divorce and of remaining unmarried have contributed and probably will continue to contribute to an increase in "singleness."

Living arrangements. Changes in marital status have engendered changes in living arrangements (table 3-4 and figure 3-1). Married-couple households have increased by only 6 percent since 1970, and they have actually declined as a proportion of all households. In 1978, most households in which there was no spouse present were maintained by a woman (19.3 million for women versus 9.4 million for men). More than one-half (54 percent) of these women lived alone, 42 percent maintained a family (of which 6 in 10 contained own children under 18), and the remaining 5 percent shared their homes only with persons who were unrelated to them. In contrast, among male householders with no wife present, more than two-thirds (68 percent) lived alone, while equal proportions either maintained a family (only one-third of which contained own children under 18) or shared their quarters with nonrelatives only (17 percent and 16 percent, respectively).

Since 1970, there has been a greater acceleration in the number of women maintaining a family household with no spouse present (46 percent) than in the comparable group of men (27 percent). However, the converse was true for those maintaining nonfamily households. The growth in the number of nonfamily households maintained by men (92 percent) was about twice that of nonfamily households maintained by women (43 percent). Most of the increase in male nonfamily householders resulted from a tripling in the number of men under 35 years old who were living entirely alone.

Housing characteristics. In 1976, most women resided in housing units that they either owned or were in the process of purchasing alone or with their husband (table 3-5). Homeownership rates varied considerably, however, by living arrangements. They were highest for married couples, with 76 percent either owning or purchasing the housing unit in which they resided. Family households maintained by a woman with no husband present owned or were purchasing their housing unit less frequently (48 percent) than either

married couples (76 percent) or families maintained by men without a wife present (63 percent). Women maintaining households with no relatives present owned their housing unit at about the same rate (47 percent) as women with relatives but no husband present; the corresponding rate was only 30 percent for households maintained by men with no relatives present.

Women maintaining a family without a husband present not only were less likely to own their place of residence than men maintaining a family without a wife, but they were also less likely to reside in single-family housing units. Fifty-nine percent of families with a woman as householder resided in single-family units, as compared with 70 percent of families maintained by men with no wife present and 79 percent of married-couple families. These differences reflect, among other things, a positive relation between income and homeownership.

The general indicators of housing conditions included in table 3-5 suggest that differences between the quality of housing occupied by women and that occupied by men were minimal and varied primarily with regard to family and nonfamily status. With regard to the relative costs of housing, however, the figures tell a different story. A generally accepted standard is that shelter costs should not exceed approximately one-fourth of a household's income. In 1976, about 22 percent of owner married couples paid one-fourth or more of their incomes for shelter, while the corresponding proportions for "no spouse" families were 57 percent for women and 30 percent for men. The percentages for women in nonfamily households were similarly large relative to those for men—64 percent of female nonfamily owners and 67 percent of female nonfamily renters paid one-fourth or more of their incomes for housing; the corresponding figures for men were 40 percent and 44 percent, respectively. In fact, 20 percent of female owners in nonfamily households paid 50 percent or more of their incomes for housing, and 46 percent who were renters paid 35 percent or more of their incomes for housing costs alone.

FIGURE 3-1.
Age Distribution of Persons Living Alone, by Sex: 1970 and 1978
(Persons 14 years and over)

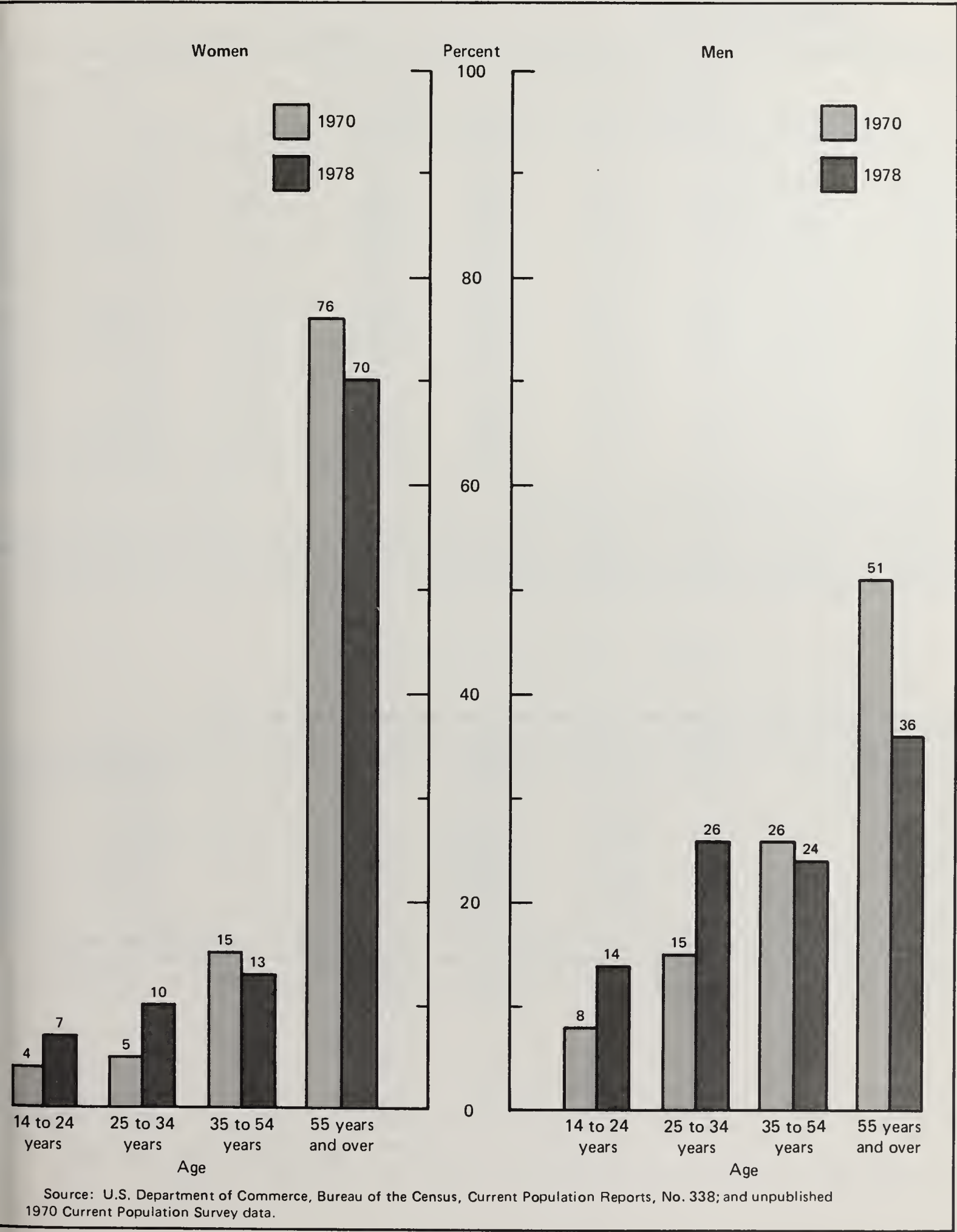


Table 3-1. Number and Rate of First Marriages, Divorces, and Remarriages for Women: 3-Year Averages, 1921 to 1977

(Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks)

Period	First marriages		Divorces		Remarriages	
	Number	Rate ¹	Number	Rate ²	Number	Rate ³
1921-23.....	990	99	158	10	186	98
1924-26.....	992	95	177	11	200	99
1927-29.....	1,025	94	201	12	181	84
1930-32.....	919	81	183	10	138	61
1933-35.....	1,081	92	196	11	162	69
1936-38.....	1,183	98	243	13	201	83
1939-41.....	1,312	106	269	14	254	103
1942-44.....	1,247	108	360	17	354	139
1945-47.....	1,540	143	526	24	425	163
1948-50.....	1,326	134	397	17	360	135
1951-53.....	1,190	122	388	16	370	136
1954-56.....	1,182	120	379	15	353	129
1957-59.....	1,128	112	381	15	359	129
1960-62.....	1,205	112	407	16	345	119
1963-65.....	1,311	109	452	17	415	143
1966-68.....	1,440	107	535	20	511	166
1969-71.....	1,649	109	702	26	515	152
1972-74.....	1,662	103	907	32	601	151
1975-77.....	1,508	85	1,070	37	646	134

¹First marriages per 1,000 single women 14 to 44 years old.

²Divorces per 1,000 married women 14 to 44 years old.

³Remarriages per 1,000 widowed and divorced women 14 to 54 years old.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-23, No. 58, and Series P-20, Nos. 323, 306, and 287; and U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Monthly Vital Statistics Reports, (PHS) 79-1120, Vol. 28, Nos. 4 and 2.

Table 3-2. Median Age at First Marriage, by Sex: Selected Years, 1890 to 1978

(Noninstitutional population excluding members of the Armed Forces living in barracks)

Year	Women	Men ¹	Year	Women	Men ¹
1978.....	21.8	24.2	1947.....	20.5	23.7
1975.....	21.1	23.5	1940.....	21.5	24.3
1970.....	20.8	23.2	1930.....	21.3	24.3
1965.....	20.6	22.8	1920.....	21.2	24.6
1960.....	20.3	22.8	1910.....	21.6	25.1
1955.....	20.2	22.6	1900.....	21.9	25.9
1950.....	20.3	22.8	1890.....	22.0	26.1

¹Figures for 1947 to 1978 are based on Current Population Survey data supplemented by data from the Department of Defense on marital status by age for men in the Armed Forces. Figures for earlier dates are from decennial censuses.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 327.

Table 3-3. Marital Status, by Age and Sex: 1978, 1975, and 1970

(Numbers in thousands. Noninstitutional population 14 years and over excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Year and age	Women					
	Total ¹		Never married	Married, husband present	Widowed	Divorced
	Number	Percent				
1978						
Total, 14 years and over.....	87,399	100.0	23.9	54.8	11.6	6.0
14 to 24 years.....	22,302	100.0	72.1	23.5	0.1	1.8
25 to 34 years.....	16,857	100.0	13.5	71.5	0.6	9.2
35 to 64 years.....	34,942	100.0	4.9	73.7	8.9	8.3
65 years and over.....	13,298	100.0	6.2	36.7	52.0	3.2
1975						
Total, 14 years and over.....	83,599	100.0	22.8	56.9	12.1	4.8
14 to 24 years.....	21,738	100.0	68.9	26.6	0.1	1.6
25 to 34 years.....	15,316	100.0	10.9	76.2	0.7	6.8
35 to 64 years.....	34,140	100.0	4.8	74.5	10.1	6.6
65 years and over.....	12,405	100.0	5.8	37.6	52.5	2.6
1970						
Total, 14 years and over.....	77,766	100.0	22.1	58.4	12.5	3.5
14 to 24 years.....	19,841	100.0	67.2	28.5	0.1	1.0
25 to 34 years.....	12,670	100.0	8.5	81.6	0.5	4.5
35 to 64 years.....	33,715	100.0	5.5	75.6	10.0	4.9
65 years and over.....	11,539	100.0	7.7	33.9	54.4	2.3
PERCENT CHANGE: 1970-78 ²						
Total, 14 years and over.....	12.4	(X)	21.7	5.6	4.2	93.5
14 to 24 years.....	12.4	(X)	20.5	-7.4	(B)	88.5
25 to 34 years.....	33.0	(X)	110.9	16.6	(B)	170.1
35 to 64 years.....	3.6	(X)	-8.5	1.0	-7.7	73.6
65 years and over.....	15.2	(X)	-6.4	25.0	10.2	58.2
Year and age	Men					
	Total ¹		Never married	Married, wife present	Widowed	Divorced
	Number	Percent				
1978						
Total, 14 years and over.....	79,863	100.0	30.6	60.0	2.3	4.2
14 to 24 years.....	21,941	100.0	83.9	14.0	-	0.9
25 to 34 years.....	16,263	100.0	20.8	69.3	0.1	6.4
35 to 64 years.....	32,488	100.0	7.0	82.2	1.6	5.8
65 years and over.....	9,170	100.0	5.4	74.8	14.2	2.9
1975						
Total, 14 years and over.....	76,349	100.0	29.5	62.3	2.4	3.3
14 to 24 years.....	21,313	100.0	81.6	16.7	-	0.6
25 to 34 years.....	14,776	100.0	17.2	74.7	0.1	4.6
35 to 64 years.....	31,539	100.0	6.9	83.1	1.9	4.8
65 years and over.....	8,722	100.0	4.7	77.3	13.6	2.5
1970						
Total, 14 years and over.....	70,559	100.0	28.1	64.3	2.9	2.2
14 to 24 years.....	18,695	100.0	80.9	17.6	-	0.4
25 to 34 years.....	12,191	100.0	14.7	79.9	0.1	2.6
35 to 64 years.....	31,336	100.0	7.3	84.7	1.9	3.1
65 years and over.....	8,336	100.0	7.5	69.9	17.1	2.3
PERCENT CHANGE: 1970-78 ²						
Total, 14 years and over.....	13.2	(X)	23.3	5.6	-9.3	116.0
14 to 24 years.....	17.4	(X)	21.6	-6.2	(B)	143.6
25 to 34 years.....	33.4	(X)	88.7	15.8	(B)	230.0
35 to 64 years.....	3.7	(X)	-4.9	0.6	-12.4	91.7
65 years and over.....	10.0	(X)	-20.7	17.6	-8.8	42.3

¹Includes married, spouse absent, not shown separately.²Percent change between absolute numbers.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, Nos. 338 and 287.

Table 3-4. Householders, by Type of Household, Presence of Spouse, Presence of Children, and Sex: 1978, 1975, and 1970

(Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Subject	1978		1975		1970		Percent change, 1970-78	
	Women	Men	Women	Men	Women	Men	Women	Men
Total married-couple households.....	47,357		46,951		44,728		5.9	
With no own children under 18.....	22,736		21,786		19,196		18.4	
With own children under 18.....	24,621		25,165		25,532		-3.6	
1 own child under 18.....	9,049		8,921		8,163		10.9	
2 own children under 18.....	9,111		8,639		8,045		13.3	
3 own children under 18.....	4,185		4,461		4,883		-14.3	
4 or more own children under 18.....	2,275		3,143		4,442		-48.8	
Total householders, no spouse present.....	19,298	9,375	16,772	7,397	13,382	5,291	44.2	77.2
Family householders.....	8,037	1,564	7,127	1,485	5,500	1,228	46.1	27.4
With no own children under 18.....	3,006	1,040	2,826	1,007	2,642	887	13.8	17.2
With own children under 18.....	5,031	524	4,301	478	2,858	341	76.0	53.7
1 own child under 18.....	2,161	297	1,740	228	1,008	179	114.4	65.9
2 own children under 18.....	1,530	156	1,221	149	810	87	88.9	79.3
3 own children under 18.....	773	45	662	54	489	33	58.1	(B)
4 or more own children under 18.....	568	26	678	47	551	42	3.1	(B)
Nonfamily householders.....	11,261	7,811	9,645	5,912	7,883	4,062	42.9	92.3
Living alone.....	10,363	6,352	9,021	4,918	7,319	3,532	41.6	79.8
14 to 24 years old.....	741	870	501	610	282	274	162.8	217.5
25 to 34 years old.....	1,022	1,675	736	1,100	358	535	185.5	213.1
35 to 54 years old.....	1,311	1,550	1,254	1,207	1,103	911	18.9	70.1
55 years and over.....	7,290	2,257	6,530	2,001	5,577	1,813	30.7	24.5
With nonrelatives present.....	898	1,458	624	995	565	530	58.9	175.1

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, Nos. 340 and 291.

Table 3-5. Selected Housing Characteristics, by Type of Household: 1976

(Numbers in thousands. Household population)

Characteristic	Family households						Nonfamily households			
	Married-couple households		Other female householder		Other male householder		Female householder		Male householder	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
TENURE										
All households.....	47,820	100.0	7,607	100.0	1,676	100.0	10,232	100.0	6,671	100.0
Owner households.....	36,418	76.2	3,635	47.8	1,058	63.1	4,811	47.0	1,983	29.7
Renter households.....	11,402	23.8	3,972	52.2	619	36.9	5,421	53.0	4,688	70.3
UNITS IN STRUCTURE										
All households.....	47,820	100.0	7,607	100.0	1,676	100.0	10,232	100.0	6,671	100.0
Single unit.....	37,636	78.7	4,523	59.4	1,171	69.8	4,782	46.7	2,501	37.5
2 to 49 units.....	6,941	14.5	2,582	33.9	383	22.9	4,117	40.3	3,135	46.9
50 or more units.....	846	1.8	233	3.1	54	3.2	841	8.2	632	9.5
Mobile home, trailer.....	2,398	5.0	269	3.5	68	4.1	491	4.8	402	6.0
Owner households.....	36,418	100.0	3,635	100.0	1,058	100.0	4,811	100.0	1,983	100.0
Single unit.....	32,737	89.9	3,186	87.6	925	87.4	3,793	78.8	1,495	75.4
2 to 49 units.....	1,463	4.1	234	6.4	69	7.3	538	11.1	200	10.1
50 or more units.....	159	0.4	10	0.3	7	0.7	61	1.3	31	1.6
Mobile home, trailer.....	2,057	5.6	207	5.7	47	4.4	419	8.7	257	13.0
Renter households.....	11,402	100.0	3,972	100.0	619	100.0	5,421	100.0	4,688	100.0
Single unit.....	4,899	43.0	1,337	33.6	246	39.7	989	18.2	1,007	21.5
2 to 49 units.....	5,476	48.0	2,350	59.2	305	49.3	3,579	66.0	2,935	62.7
50 or more units.....	687	6.0	223	5.6	47	7.6	780	14.4	601	12.8
Mobile home, trailer.....	340	3.0	62	1.6	21	3.4	72	1.3	145	3.1
HOUSING QUALITY										
Persons per room:										
All households.....	47,820	100.0	7,607	100.0	1,676	100.0	10,232	100.0	6,671	100.0
1.00 or less.....	45,050	94.2	7,088	93.2	1,590	94.9	10,222	99.9	6,637	99.5
1.01 or more.....	2,770	5.8	518	6.8	88	5.3	10	0.1	34	0.5
Plumbing facilities:										
All households.....	47,820	100.0	7,607	100.0	1,676	100.0	10,232	100.0	6,671	100.0
With all facilities.....	47,118	98.5	7,367	96.8	1,584	94.5	9,870	96.5	6,122	91.8
Lacking some or all plumbing facilities.....	702	1.5	239	3.1	93	5.5	362	3.5	549	8.2
Interior ceilings and walls:										
All households.....	47,820	100.0	7,607	100.0	1,676	100.0	10,232	100.0	6,671	100.0
Open cracks or holes:										
No open cracks.....	45,765	95.7	6,801	89.4	1,553	92.7	9,661	94.4	6,146	92.1
With open cracks.....	1,965	4.1	799	10.5	120	7.2	543	5.3	518	7.8
Not reported.....	90	0.2	6	0.1	4	0.2	27	0.3	7	0.1
SELECTED HOUSING COSTS OF OWNERS AS A PERCENTAGE OF INCOME										
Specified owner households....	18,350	100.0	1,477	100.0	368	100.0	640	100.0	523	100.0
Less than 15 percent.....	6,732	36.7	206	13.9	117	31.8	63	9.8	113	21.6
15 to 24 percent.....	7,649	41.7	437	29.6	139	37.8	168	26.3	203	38.8
25 to 49 percent.....	3,440	18.7	564	38.2	91	24.7	279	43.6	151	28.9
50 percent or more.....	529	2.9	270	18.3	21	5.7	130	20.3	56	10.7
GROSS RENT OF RENTERS AS A PERCENTAGE OF INCOME										
Specified renter households....	10,196	100.0	3,815	100.0	567	100.0	5,091	100.0	4,311	100.0
Less than 15 percent.....	3,173	31.1	396	10.4	177	31.2	343	6.7	1,007	23.4
15 to 24 percent.....	3,788	37.2	1,005	26.3	200	35.3	1,321	25.9	1,404	32.6
25 to 34 percent.....	1,628	16.0	783	20.5	82	14.5	1,086	21.3	722	16.7
35 percent or more.....	1,607	15.8	1,631	42.8	108	19.0	2,341	46.0	1,178	27.3

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1976 Annual Housing Survey data.

Chapter 4



Fertility

The fertility of American women has declined during the 1970's, reaching a lower level than the previous low point, recorded during the mid-1930's. The annual number of live births declined steadily from 1970 to 1973, but increased slightly beginning in 1974 (figure 4-1). Meanwhile, the total fertility rate¹ declined between 1970 and 1976, increasing only in 1977. The increase in births for years in which the total fertility rate declined is the result of increases in the number of women of childbearing age. Since 1972, the total fertility rate has been below the level required for long-run replacement of the population in the absence of net immigration.

Children ever born. Data on children ever born reflect the recent pattern of fertility change (table 4-1). Women 18 to 44 years old had borne an average of 1.9 children per woman by 1970, an average that dropped to about 1.6 children per woman in 1978. Women 20 to 24 years old during the 1970's averaged fewer than one child per woman; these women had an average of 0.7 children per woman in 1970 and about 0.6 children per woman in both 1976 and 1978. Women 35 to 39 years old, nearing the end of their reproductive years, had borne about 3.0 children per woman in 1970; by 1978 women of this age averaged about 2.7 children per woman. The decline between 1970 and 1978 in the number of children ever born primarily reflects the fertility behavior of married women, since most births occur within marriage. Although the number of children ever born to married women 15 to 44 years old declined from about 2.4 children per woman in 1970 to approximately 2.0 children per woman in 1978, the reverse was true for never-married women. As seen in table 4-1, there was a slight increase in the average number of children ever born to never-married women 18 to 44 years old between 1970 and 1978. This up-turn parallels recent increases in out-of-wedlock births in the United States.²

¹ The total fertility rate for a given year shows how many births a group of 1,000 women would have by the end of their childbearing period, if during their entire reproductive period they were to experience the age-specific birth rates for that given year.

² U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, *Monthly Vital Statistics Report*, Vol. 27, No. 11 (February 1979 supplement).

The number of children ever born per woman varies by age at first marriage and by selected socioeconomic characteristics of the woman. For each age group, the number of children ever born is inversely related to the woman's age at first marriage (table 4-2). Among women 40 to 44 years old in 1978, those who had married between 14 and 17 years of age had an average of 3.9 children per woman, whereas those women marrying between 30 and 34 years of age averaged only 1.8 children each.

Higher educational attainment and participation in the labor force are also associated with lower levels of fertility. In general, as a woman's educational level rises, the number of children ever born to her declines. Women 35 to 39 years old who had completed fewer than 8 years of elementary school had borne an average of 3.8 children each as of 1978, compared with 2.1 children per woman for those with 4 or more years of college. It is not surprising, therefore, that the decline during the 1970's in the average number of children ever born per woman has paralleled recent trends toward delayed marriage, higher educational attainment, and greater labor force activity among women.

Cohort analysis. The proportion of women marrying and having children at early ages varies according to the period

of the woman's birth. Among women born from 1930 to 1944, whose years of greatest childbearing occurred primarily during the baby boom, a larger proportion married and had their first child by age 20 than did women born in earlier or later periods (table 4-3).³ The recent pattern of delayed marriage and childbearing has already had a dampening effect on annual fertility rates. If this pattern persists, it will certainly act to reduce completed family size and to lower the Nation's rate of population growth.

Lifetime birth expectations. Data on the lifetime birth expectations of American women in the 1970's reflect changing attitudes about expected family size. Birth expectations of currently married women 18 to 29 years old appear to have stabilized in the 1970's at slightly more than two children per woman (table 4-4). Larger proportions of these women in 1978, than of those in 1971, expected to have 0 to 2 births. This decline in lifetime birth expectations reflects changes in actual births to date as well as in future births expected.

³The difference in the proportion of women having their first child by age 20 was not statistically significant between the 1930-34 birth cohort and the 1945-49 birth cohort.

FIGURE 4-1.
Total Fertility Rate and Number of Live Births: 1970 to 1978

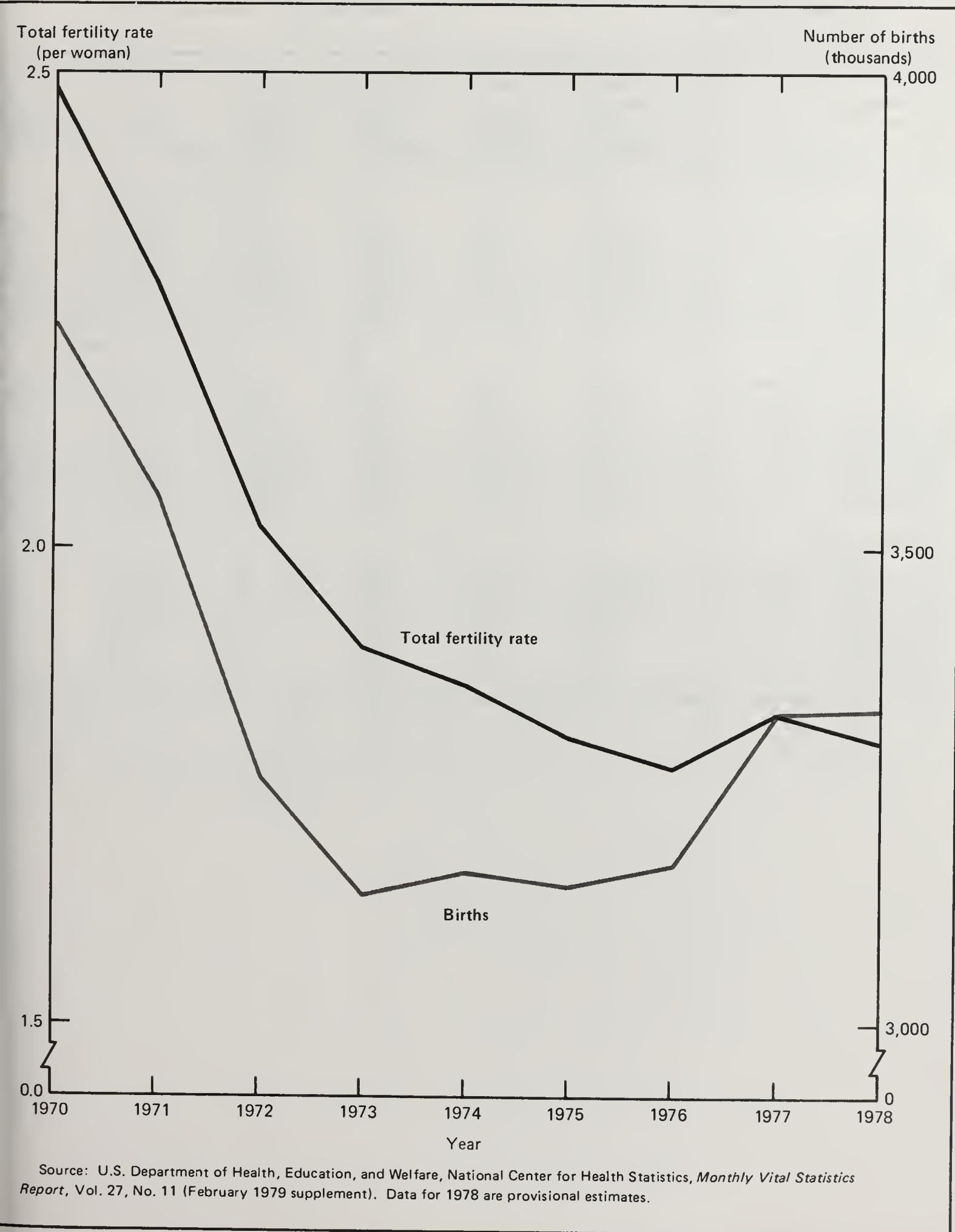


Table 4-1. Children Ever Born Per 1,000 Women 15 to 44 Years Old, by Marital Status and Age: 1978, 1976, and 1970

(Civilian noninstitutional population for 1978 and 1976; resident population for 1970)

Marital status and age of woman	1978		1976		1970	
	Number of women (thousands)	Children ever born per 1,000 women	Number of women (thousands)	Children ever born per 1,000 women	Number of women (thousands)	Children ever born per 1,000 women
TOTAL WOMEN						
Total, 18 to 44 years....	43,555	1,583	41,605	1,645	36,567	1,918
18 and 19 years.....	4,175	174	4,184	181	3,642	206
20 to 24 years.....	10,038	556	9,656	582	8,355	736
25 to 29 years.....	8,989	1,250	8,861	1,359	6,810	1,790
30 to 34 years.....	7,962	1,990	7,158	2,158	5,869	2,640
35 to 39 years.....	6,620	2,673	6,062	2,807	5,711	3,015
40 to 44 years.....	5,771	3,096	5,684	3,091	6,150	2,952
WOMEN EVER MARRIED						
Total, 15 to 44 years....	32,564	2,040	31,907	2,082	29,054	2,357
15 to 17 years.....	225	578	226	389	272	566
Total, 18 to 44 years.....	32,340	2,050	31,680	2,094	28,783	2,372
18 and 19 years.....	798	540	899	588	856	659
20 to 24 years.....	5,200	908	5,470	897	5,324	1,064
25 to 29 years.....	7,354	1,443	7,510	1,539	5,982	1,978
30 to 34 years.....	7,229	2,135	6,626	2,291	5,433	2,804
35 to 39 years.....	6,262	2,788	5,720	2,931	5,373	3,167
40 to 44 years.....	5,497	3,212	5,455	3,190	5,815	3,096
NEVER-MARRIED WOMEN						
Total, 18 to 44 years....	11,216	235	9,925	212	7,772	211
18 and 19 years.....	3,377	87	3,286	69	2,805	67
20 to 24 years.....	4,838	178	4,186	171	3,031	159
25 to 29 years.....	1,635	383	1,351	358	828	428
30 to 34 years.....	733	559	532	504	436	595
35 to 39 years.....	358	656	342	725	337	593
40 to 44 years.....	275	753	228	724	335	460

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, Nos. 341 and 308.

Table 4-2. Children Ever Born Per 1,000 Women Ever Married, by Age and Selected Socioeconomic Characteristics: 1978

(Civilian noninstitutional population. For meaning of symbols, see text)

Selected characteristic of woman	20 to 24 years		25 to 29 years		30 to 34 years		35 to 39 years		40 to 44 years	
	Number of women (thousands)	Children ever born per 1,000 women	Number of women (thousands)	Children ever born per 1,000 women	Number of women (thousands)	Children ever born per 1,000 women	Number of women (thousands)	Children ever born per 1,000 women	Number of women (thousands)	Children ever born per 1,000 women
AGE AT FIRST MARRIAGE										
14 to 17 years.....	1,161	1,553	1,091	2,317	1,169	2,966	1,292	3,577	1,067	3,892
18 and 19 years.....	2,031	952	2,233	1,736	2,005	2,429	1,742	3,029	1,542	3,457
20 and 21 years.....	1,460	558	1,922	1,307	1,671	2,003	1,319	2,707	1,265	3,127
22 to 24 years.....	548	305	1,589	880	1,574	1,745	1,066	2,396	958	2,884
25 to 29 years.....	(X)	(X)	520	563	703	1,294	586	1,935	448	2,469
30 to 34 years.....	(X)	(X)	(X)	(X)	107	850	206	1,126	143	1,776
35 to 44 years.....	(X)	(X)	(X)	(X)	(X)	(X)	51	(B)	73	(B)
METROPOLITAN-NONMETROPOLITAN RESIDENCE										
Total.....	5,200	908	7,354	1,443	7,229	2,135	6,262	2,788	5,497	3,212
Metropolitan areas.....	3,340	871	5,047	1,380	4,946	2,030	4,211	2,695	3,773	3,165
In central cities.....	1,436	878	2,100	1,398	1,793	2,050	1,512	2,785	1,407	3,156
Outside central cities.....	1,904	866	2,948	1,367	3,153	2,019	2,699	2,644	2,366	3,170
Nonmetropolitan areas.....	1,860	973	2,307	1,579	2,283	2,361	2,051	2,980	1,724	3,316
YEARS OF SCHOOL COMPLETED										
Elementary: 0 to 7 years.....	104	1,913	183	2,213	217	3,101	254	3,760	314	4,188
8 years.....	113	1,531	158	2,405	184	3,348	241	3,498	246	3,931
High school: 1 to 3 years.....	889	1,541	780	2,268	875	2,869	1,009	3,514	906	3,734
4 years.....	2,729	867	3,489	1,561	3,304	2,169	2,866	2,705	2,586	3,077
College: 1 to 3 years.....	975	506	1,451	1,172	1,320	1,884	951	2,462	824	2,944
4 or more years...	391	302	1,294	702	1,329	1,490	941	2,147	621	2,591
LABOR FORCE STATUS										
In labor force.....	3,216	668	4,297	1,146	4,031	1,888	3,703	2,589	3,452	3,081
Employed.....	2,845	609	3,998	1,114	3,789	1,855	3,517	2,560	3,269	3,044
Unemployed.....	371	1,113	299	1,579	242	2,401	186	3,124	184	3,717
Not in labor force.....	1,984	1,297	3,057	1,860	3,199	2,444	2,559	3,076	2,045	3,433

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 341; and unpublished 1978 Current Population Survey data.

Table 4-3. Marriage and Childbearing at Early Ages, for Cohorts of Women Born From 1920-24 to 1950-54: 1978

(Civilian noninstitutional population. For meaning of symbols, see text)

Year woman was born	Number of women (thousands)	By age 20		By age 25	
		Percent married by this age	Percent having first child by this age	Percent married by this age	Percent having first child by this age
1950 to 1954.....	9,230	35.8	23.0	(NA)	(NA)
1945 to 1949.....	8,548	39.5	25.1	80.5	61.2
1940 to 1944.....	6,901	43.3	29.1	81.6	67.9
1935 to 1939.....	5,957	46.5	29.1	83.3	71.6
1930 to 1934.....	5,680	43.5	25.3	81.4	67.4
1925 to 1929.....	6,025	38.8	22.0	79.5	63.0
1920 to 1924.....	6,056	34.3	18.3	76.6	55.1

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 4-4. Lifetime Birth Expectations of Women 18 to 29 Years Old, by Age: 1978, 1975, and 1971

(Data restricted to women reporting on birth expectations. Civilian noninstitutional population)

(Data restricted to women reporting on birth expectations. Civilian noninstitutionalized population)

Subject	Total women, 1978 ¹	Currently married women		
		1978	1975	1971
WOMEN, 18 TO 24 YEARS OLD				
Number.....(thousands)...	10,541	4,507	4,743	4,987
Lifetime births expected per 1,000 women.....	2,033	2,166	2,173	2,375
Percent distribution by lifetime births expected:				
Total.....	100.0	100.0	100.0	100.0
0 or 1 birth.....	24.5	17.8	15.3	12.4
2 births.....	48.8	54.4	58.2	51.6
3 births.....	17.6	19.6	19.4	23.7
4 or more births.....	9.0	8.2	7.0	12.3
WOMEN, 25 TO 29 YEARS OLD				
Number.....(thousands)...	7,223	5,151	5,163	4,514
Lifetime births expected per 1,000 women.....	2,060	2,215	2,260	2,620
Percent distribution by lifetime births expected:				
Total.....	100.0	100.0	100.0	100.0
0 or 1 birth.....	24.7	17.6	16.6	10.0
2 births.....	46.5	50.7	50.4	44.1
3 births.....	19.9	22.2	23.3	27.6
4 or more births.....	9.0	9.5	9.8	18.3

¹Includes women of all marital classes.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, Nos. 341, 301, and 277.

Chapter 5

Education



In recent years, important changes in school enrollment and educational attainment have narrowed the gap between the educational achievement of women and men. Although women have traditionally been about as likely as men to complete high school, substantial differences remained in the proportions of women and men who continued on to college. As illustrated in figure 5-1, the high school completion rates of both women and men have risen steadily over most of the past 50 years, and as indicated by the similarity of the high school graduation rates of persons 20 to 30 years old, the rates of both sexes have leveled off at about 80 to 85 percent in recent years.

Enrollment. Between 1970 and 1978, the number of women 16 to 34 years old enrolled in college increased by 57 percent, compared with a 16-percent increase for men, and the distribution of women throughout the various fields of study became more similar to that of men. In the same 8-year period, the proportion of women 25 to 29 years old who had completed 1 or more years of college also increased, from 27 percent to 42 percent (table 5-1). In 1970, about 36 percent of women high school graduates 25 to 29 years old had gone on to complete at least 1 year of college, compared with about 47 percent of similar men. By 1978, about 49 percent of such women had completed a year or more of college, compared with about 59 percent of their male counterparts.

In 1978, about 4.7 million women and 5.1 million men 16 to 34 years old were enrolled in college at all levels (table 5-2). In 1970, the total number of such women was 3.0 million, while the enrollment of men was about 4.4 million. Women's enrollment in graduate programs doubled over the 8-year period, with most of the increase occurring in the second and later years of graduate school. Enrollment of men in graduate programs increased by 20 percent.

The expansion of women's college enrollment overall (graduate enrollment as well as undergraduate) has helped to raise the number of women per 100 men in college from 68 in 1970 to 92 in 1978. In 1970, about 69 women for every 100 men were enrolled in 2-year colleges; by 1978, the number of women enrolled in 2-year colleges was about equal to the number of men. Women enrolled in the first and second years of 4-year colleges were also as numerous as men in 1978, but the number of women per 100 men in the

third and fourth years of college was only 84, up from 62 in 1970.

In graduate programs, the number of women per 100 men increased from about 47 in 1970 to about 80 in 1978. In fact, in the first year of graduate study, the number of women enrolled was about equal to the number of men. The number of women enrolled in the second and later years of graduate study increased until by 1978 it was two-thirds as large as the number of men. In 1970, women's enrollment had been less than one-third of men's enrollment in the second and later years of graduate study.

Educational attainment. As the number of women enrolled in college has increased, so has the number of degrees earned by women (table 5-3). Women received about 424,000 bachelor's degrees in the 1976-77 academic year, an increase of 83,000 over the 1969-70 academic year; they earned about 149,000 master's degrees, an increase of 67,000; and 8,000 doctorates, an increase of 4,000. The proportions of all bachelor's, master's, and doctoral degrees conferred on women have also risen. In the 1969-70 academic year, women received 43 percent of the bachelor's degrees, 40 percent of the master's degrees, and 13 percent of the doctoral degrees. In the 1976-77 academic year, the proportion of degrees received by women had jumped to 46 percent of the bachelor's, 47 percent of the master's, and 24 percent of the doctoral degrees.

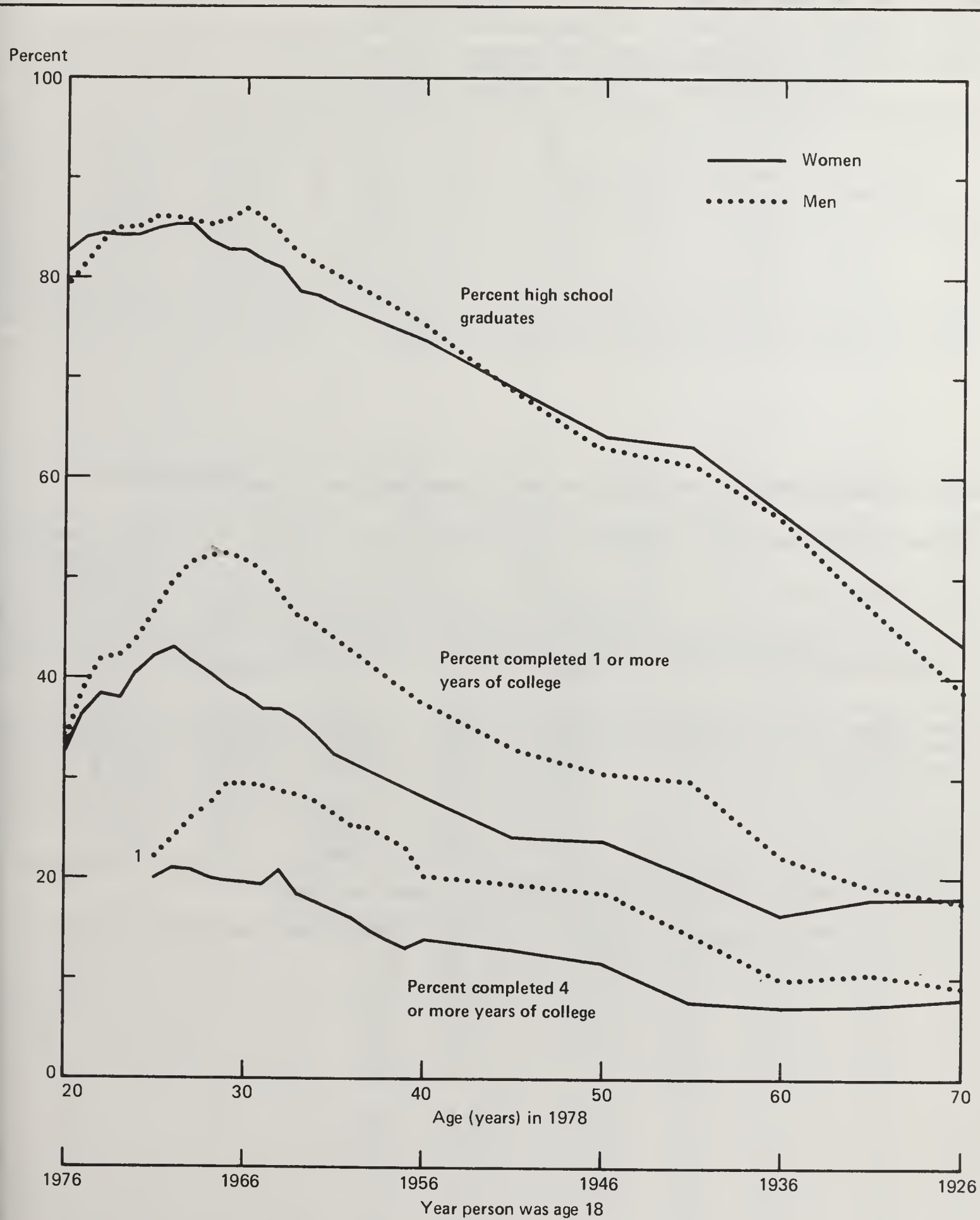
Women received a majority of the bachelor's and master's degrees conferred in certain fields of study. At the bachelor's level in the 1976-77 academic year, for example, women received 72 percent of the degrees conferred in education, 76 percent in foreign languages, and 79 percent in the health professions. At the master's level, 66 percent, 69 percent, and 68 percent of the degrees conferred in those respective fields were earned by women. In some traditionally male fields, however, women still received a small minority of the

degrees conferred, although the proportions of degrees earned by women in these fields increased. At the bachelor's level in the 1969-70 academic year, women received 28 percent of the degrees in the biological sciences, 9 percent of the degrees in business, and about 1 percent of the degrees in engineering. By the 1976-77 year, 36 percent of the degrees in the biological sciences, 23 percent of the degrees in business, and 5 percent of the degrees in engineering were earned by women. At the doctorate level in 1976-77, only in foreign languages did women earn the majority of degrees conferred. Thus, women were still overrepresented in certain fields, and even in traditionally female fields such as education, few women went on to earn doctorates in the 1976-77 academic year.

Both women and men 25 to 34 years old who had never married had higher levels of educational attainment in 1978 than those who were currently married, widowed, or divorced (table 5-4). Never-married women had achievement levels very similar to those of never-married men, with about one-third having completed 4 or more years of college. The attainment levels of never-married women appeared to be more like the levels attained by men than like those of women who were of other marital status. Among persons who had ever married, 18 percent of the women, compared with 26 percent of the men, had completed 4 or more years of college.

The data in table 5-5 suggest that there is a relationship between a woman's educational attainment and the preprimary schooling of her children. Children whose mothers had completed some college were more likely to be enrolled in preprimary programs than other children. Among 3- and 4-year-old children, for example, about 30 percent of those whose mothers had completed high school but did not continue on to college were enrolled in preprimary programs in 1978, compared with about 48 percent of children whose mothers had completed 1 to 3 years of college.

FIGURE 5-1.
Percent of Persons 20 to 70 Years Old, by Years of School Completed and Sex: 1978



¹ Data not applicable for persons 20 to 24 years old.

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 5-1. Years of School Completed by Persons 25 to 29 Years Old, by Sex: 1978, 1975, and 1970

(Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks for 1978 and 1975; total population excluding members of the Armed Forces living in barracks for 1970)

Years of school completed	Women			Men		
	1978	1975	1970	1978	1975	1970
Total, 25 to 29 years old....	8,953	8,345	6,854	8,650	8,048	6,659
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
Elementary : 0 to 8 years.....	4.5	5.4	6.7	4.6	6.0	8.9
High school: 1 to 3 years.....	11.0	12.8	19.1	9.4	9.5	14.4
4 years.....	42.6	45.7	47.6	35.0	37.2	40.4
College: 1 to 3 years.....	21.3	17.3	13.7	25.0	22.2	16.2
4 or more years.....	20.6	18.7	12.9	26.0	25.1	20.0

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, Nos. 295 and 207; and unpublished 1978 Current Population Survey data.

Table 5-2. College Enrollment of Persons 16 to 34 Years Old, by Level, Type, and Sex: 1978 and 1970

(Numbers in thousands. Civilian noninstitutional population)

College level and type	Women		Men		Percent change, 1970-78	
	1978	1970	1978	1970	Women	Men
Total college enrollment.....	4,714	3,013	5,124	4,401	56.5	16.4
Undergraduate enrollment ¹	3,969	2,646	4,188	3,627	50.0	15.5
2-year college.....	1,239	691	1,214	1,001	79.3	21.3
4-year college.....	2,579	1,852	2,822	2,525	39.3	11.8
1st and 2d year.....	1,289	1,038	1,291	1,206	24.2	7.1
3d and 4th year.....	1,290	814	1,531	1,319	58.5	16.1
Graduate enrollment.....	745	366	935	774	103.6	20.8
1st year.....	383	244	389	340	57.0	14.4
2d year and higher.....	362	122	546	434	196.7	25.8

¹Includes persons who did not report type of college, not shown separately.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 222; and unpublished 1978 Current Population Survey data.

Table 5-3. Degrees Conferred by Institutions of Higher Education in the United States, by Selected Fields of Study: Academic Years 1976-77 and 1969-70

Year and field of study	Bachelor's degree		Master's degree		Doctoral degree	
	Number of women receiving degree	Percent of degrees received by women	Number of women receiving degree	Percent of degrees received by women	Number of women receiving degree	Percent of degrees received by women
1976-77 ACADEMIC YEAR						
All fields.....	424,004	46.1	149,381	47.1	8,090	24.3
Biological sciences.....	19,387	36.2	2,396	33.7	726	21.4
Business and management.....	35,583	23.4	6,664	14.3	55	6.3
Education.....	103,740	72.2	83,201	65.8	2,769	34.8
Engineering.....	2,218	4.5	720	4.4	73	2.8
Fine and applied arts.....	25,627	61.3	4,425	51.2	215	32.5
Foreign languages.....	10,573	75.8	2,182	69.3	387	51.5
Health professions.....	45,381	79.2	8,788	67.9	172	32.0
Physical sciences.....	4,501	20.0	881	16.5	319	9.5
Social sciences.....	46,131	39.3	5,089	32.9	835	22.1
1969-70 ACADEMIC YEAR						
All fields.....	341,219	43.1	82,667	39.7	3,976	13.3
Biological sciences.....	10,385	27.8	1,825	31.5	469	14.3
Business and management.....	9,172	8.7	749	3.5	10	1.7
Education.....	124,106	75.0	43,898	55.3	1,196	20.3
Engineering.....	330	0.7	172	1.1	24	0.7
Fine and applied arts.....	20,554	57.3	3,691	47.0	142	19.3
Foreign languages.....	15,496	73.4	3,220	62.7	290	33.4
Health professions.....	16,895	78.0	2,335	52.0	58	16.2
Physical sciences.....	2,917	13.6	842	14.2	235	5.4
Social sciences.....	57,147	37.1	8,291	35.3	490	13.0

Source: U.S. Department of Health, Education, and Welfare, National Center for Education Statistics, Digest of Education Statistics, 1971, table 117; and unpublished 1976-77 data on earned degrees conferred.

Table 5-4. Years of School Completed by Persons 25 to 34 Years Old, by Marital Status and Sex: 1978

Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Sex and marital status	Total		Years of school completed				
	Number	Percent	Elementary, 0 to 8 years	High school		College	
				1 to 3 years	4 years	1 to 3 years	4 or more years
All women, 25 to 34 years...	16,857	100.0	5.4	11.8	43.3	19.6	20.0
Never married.....	2,279	100.0	7.0	8.6	30.4	21.5	32.5
Ever married.....	14,578	100.0	5.2	12.3	45.3	19.4	17.9
Married, husband present.....	12,055	100.0	4.7	11.4	45.6	19.0	19.3
Married, husband absent.....	865	100.0	10.9	19.5	43.8	19.2	6.6
Widowed.....	104	100.0	12.5	25.0	34.6	25.0	2.9
Divorced.....	1,554	100.0	5.3	14.6	44.1	21.8	14.2
All men, 25 to 34 years.....	16,263	100.0	5.3	9.4	35.0	22.7	27.5
Never married.....	3,383	100.0	6.9	7.7	27.3	24.1	33.8
Ever married.....	12,880	100.0	4.9	9.8	37.1	22.4	25.8
Married, wife present.....	11,270	100.0	4.9	9.5	37.1	22.0	26.5
Married, wife absent.....	553	100.0	7.7	15.2	32.9	24.8	20.0
Widowed.....	16	100.0	(B)	(B)	(B)	(B)	(B)
Divorced.....	1,041	100.0	3.7	10.4	38.3	25.3	21.9

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 5-5. Enrollment of Children 3 to 5 Years Old in Preprimary Programs, by Years of School Completed by Their Mothers: 1978, 1974, and 1970

(Numbers in thousands. Civilian noninstitutional population)

Age of child and years of school completed by mother	1978		1974		1970	
	Number	Percent enrolled	Number	Percent enrolled	Number	Percent enrolled
ALL CHILDREN 3 TO 5 YEARS OLD						
Children with mothers.....	8,883	50.2	10,232	45.2	10,742	37.6
Elementary: 0 to 8 years.....	922	38.1	899	30.9	1,217	22.4
High school: 1 to 3 years.....	1,517	42.3	1,919	36.0	2,352	31.9
4 years.....	3,925	47.9	4,669	43.8	5,001	38.0
College: 1 to 3 years.....	1,416	59.7	1,617	54.2	1,343	48.7
4 or more years.....	1,104	67.1	1,129	65.4	828	55.8
CHILDREN 3 AND 4 YEARS OLD						
Children with mothers.....	5,903	33.9	6,863	28.8	7,008	20.6
Elementary: 0 to 8 years.....	614	16.6	590	15.9	812	10.3
High school: 1 to 3 years.....	1,005	24.3	1,262	16.5	1,486	13.7
4 years.....	2,580	30.0	3,140	25.3	3,268	19.1
College: 1 to 3 years.....	949	47.8	1,101	40.9	914	32.9
4 or more years.....	755	56.9	771	55.9	528	44.1
CHILDREN 5 YEARS OLD						
Children with mothers.....	2,980	82.4	3,369	78.6	3,734	69.4
Elementary: 0 to 8 years.....	308	80.8	309	59.5	405	46.7
High school: 1 to 3 years.....	512	77.5	657	73.5	866	63.1
4 years.....	1,345	82.5	1,529	81.7	1,733	73.6
College: 1 to 3 years.....	467	83.7	516	82.6	429	82.4
4 or more years.....	349	88.9	358	85.8	300	76.0

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 318; and unpublished 1978 Current Population Survey data.

Chapter 6

Labor Force Participation



The changing social and economic status of American women has been reflected in the labor force, perhaps to a greater degree than in any other segment of American life. The 1970-78 period witnessed the continuation of trends of the past several decades that have made work outside the home an increasingly common occurrence among women, even for mothers with very young children. About one-half of all women were in the work force at any one time in 1978, and nearly 56 percent had at least some work experience during the previous year. The anticipated continuation of these trends is expected to influence substantially the composition of the labor force during the next two decades.

Labor force growth. Between 1970 and 1978, the number of female workers increased from nearly 32 million to 42 million (slightly over $1\frac{1}{2}$ times the increase in the number of male workers) (table 6-1 and figure 6-1). As a result, there were about 7 female workers in 1978 for every 10 male workers, an increase of 1 female worker per 10 male workers over the 1970 ratio. The increases occurred among women of all ages, but they were especially pronounced for women under 45 years of age. The number of women 16 to 24 years old in the labor force grew by over one-third, for example, while the number of female workers 25 to 34 years old nearly doubled. Both population growth and increased labor force participation played a part in these increases. The labor force participation rate (i.e., the proportion of the population 16 years old and over in the labor force) for women age 20 to 24, for instance, increased from about 58 percent in 1970 to about 69 percent in 1978. Women 25 to 34 years old showed an even greater gain, with their rates rising from 45 percent to 62 percent in this time span (table 6-2). These increasing labor force participation rates, coupled with the movement of the baby-boom generation into these age categories, accounted for the spectacular labor force growth in these age groups.

Labor force participation rates. The increase in the labor force participation rates of women has occurred alongside a decline in the participation rates for men. The overall annual labor force participation rate for women increased

from about 43 percent in 1970 to about 50 percent in 1978; in fact, in June 1978, the monthly rate passed the 50 percent mark for the first time in U.S. history, and stayed at about that level for the remaining months of 1978.¹ The annual rate for men, however, declined from about 81 percent to 78 percent during the 1970-78 period. Rising participation rates for women in the face of decreasing rates for men have given women an increasing share of the Nation's work force (from about 37 percent in 1970 to about 41 percent in 1978). Declines in labor force participation rates have occurred in most age groups for men, whereas women have experienced increasing labor force rates in all age groups under 55 years. The decline for men reflects, in part, the spread and liberalization of pension, disability, and retirement plans, and changing social attitudes toward work and leisure. That the rates for women have risen in the presence of some of these same forces attests to the strength and durability of the movement of women into the labor force.

Education. Labor force behavior of women is influenced more than that of men by life-cycle events such as marriage, childbearing, and childrearing. As is true for men, personal characteristics such as education, training, and previous work experience positively influence a woman's decision to seek employment in the marketplace. It is not surprising, then, that the more education a woman has, the more likely it is that she will be in the labor force. As shown in table 6-3, the lowest labor force participation rates for both women and men in 1978 were for persons who failed to graduate from high school (about 32 percent for women and about 63 percent for men), whereas the highest rates were for persons with 4 or more years of college (about 66 percent for women and about 90 percent for men).

Marital status. Between 1950 and 1970, married women living with their husbands contributed more than women of any other marital status to the expansion of the female labor force.² Although the absolute *size* of this group in the labor force has continued to grow (24 percent from 1970 to 1978), never-married and divorced women have experienced higher *rates* of labor force growth during this period (table 6-4). The number of never-married women in the labor force, for instance, increased by about 47 percent from 1970 to 1978, and the number of divorced women rose by about 102 percent. The substantial increase in the number of never-married women in the labor force is associated with the maturing of the baby boom children and with the current tendency among young women to postpone marriage.

Never-married and divorced women traditionally have had the highest labor force participation rates among women, a pattern that has continued in the 1970's. In 1978, about 61 percent of the never-married women and about 74 percent of the divorced women were in the labor force, compared with about 48 percent of the married women living with their husbands (table 6-5).

Despite the growth in the number of never-married and divorced women in the labor force between 1970 and 1978, the majority of women in the 1978 labor force—about 23 million (56 percent) of the 41 million female workers—were married and living with their husbands. The labor force participation rate for married women, husband present, rose from 41 percent in 1970 to 48 percent in 1978 (table 6-6). Among the categories of married women classified by presence and age of children, mothers with children under 3 years old had a gain of 12 percentage points in their labor force rate over the 8-year span. Notwithstanding this increase in the labor force rate for mothers with young children, childbearing and childrearing are still major factors causing some women to interrupt and others to curtail their employment careers. As compared with other mothers, the mothers with children under 3 years of age, for instance, had a relatively low labor force participation rate in 1978 of 38 percent; it was 48 percent for women with children 3 to 5 years and 57 percent for women with children 6 to 17 years only. Still, the data indicate that an ever-increasing proportion of women are combining the roles of wife and mother with work outside the home.

Part-time employment. One factor often cited as contributing to the increased labor force participation of women has been the growth of the service industry, in which opportunities for part-time employment are more prevalent than in other types of industries. That part-time employment is important to many women can be seen from the fact that in 1978, about 12 million women (over one-fourth of all employed women) held part-time jobs, compared with about 6.4 million men (around one-tenth of all employed men) (table 6-7). These figures represent increases of about 36 percent for women and about 20 percent for men from 1970 to 1978. The number of teenage girls and the number of teenage boys who worked part time in 1978 were nearly equal (about 2.5 million each). The number of adult women 20 years old and over who worked part time in 1978, however, was substantially more than the number of adult men working part time (9.3 million women versus 3.9 million men).

Unemployment. Partly because women tend to leave and reenter the labor force more often than men and because women generally have less lifetime labor force experience than men, the unemployment rates for women have tradi-

¹ See U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 25, Nos. 7-12.

² See U.S. Department of Commerce, Bureau of the Census, *Current Population Reports*, Series P-23, No. 58, p. 30.

tionally exceeded those for men. This pattern was true as well during the 1970-78 period (table 6-8). The overall unemployment rate for women in 1978 was 7.2 percent (about 3 million unemployed out of a labor force of about 42 million); for men, the rate was 5.2 percent. Teenagers, who face many of the same kinds of employment problems regardless of sex, had much higher unemployment rates in 1978 than adult men or women. Teenage girls had a rate of 17.0 percent, and teenage boys had a rate of 15.7 percent.

Projections. The 1995 labor force is projected to consist of 56 million women and 66 million men (table 6-9). These figures represent about a 34-percent increase for women and a 14-percent increase for men over the 1978 figures. The projection assumes a continuation of the basic trend of the last few decades of relatively greater increases in labor force participation for women than for men.

The numbers of both female and male workers in the two youngest age groups (16 to 19 and 20 to 24) and the two oldest age groups (55 to 64 and 65 and over) are expected to decline between 1978 and 1995. The number of men 65 years and over in the labor force, for example, is expected to decline by about 14 percent, while the number of female workers of this age would fall by about 11 percent. The number of female teenage workers is expected to decrease by nearly 16 percent, and the number of female workers 20 to 24 years would go down by about 4 percent. The current low birth rate is a factor in the predicted decline in the labor force representation of the younger workers, and the continued tendency toward earlier retirement is a factor for the predicted decline among the older workers. How recent legislation lifting the mandatory retirement of persons at age

65 will influence the composition of the 1995 work force remains to be seen.

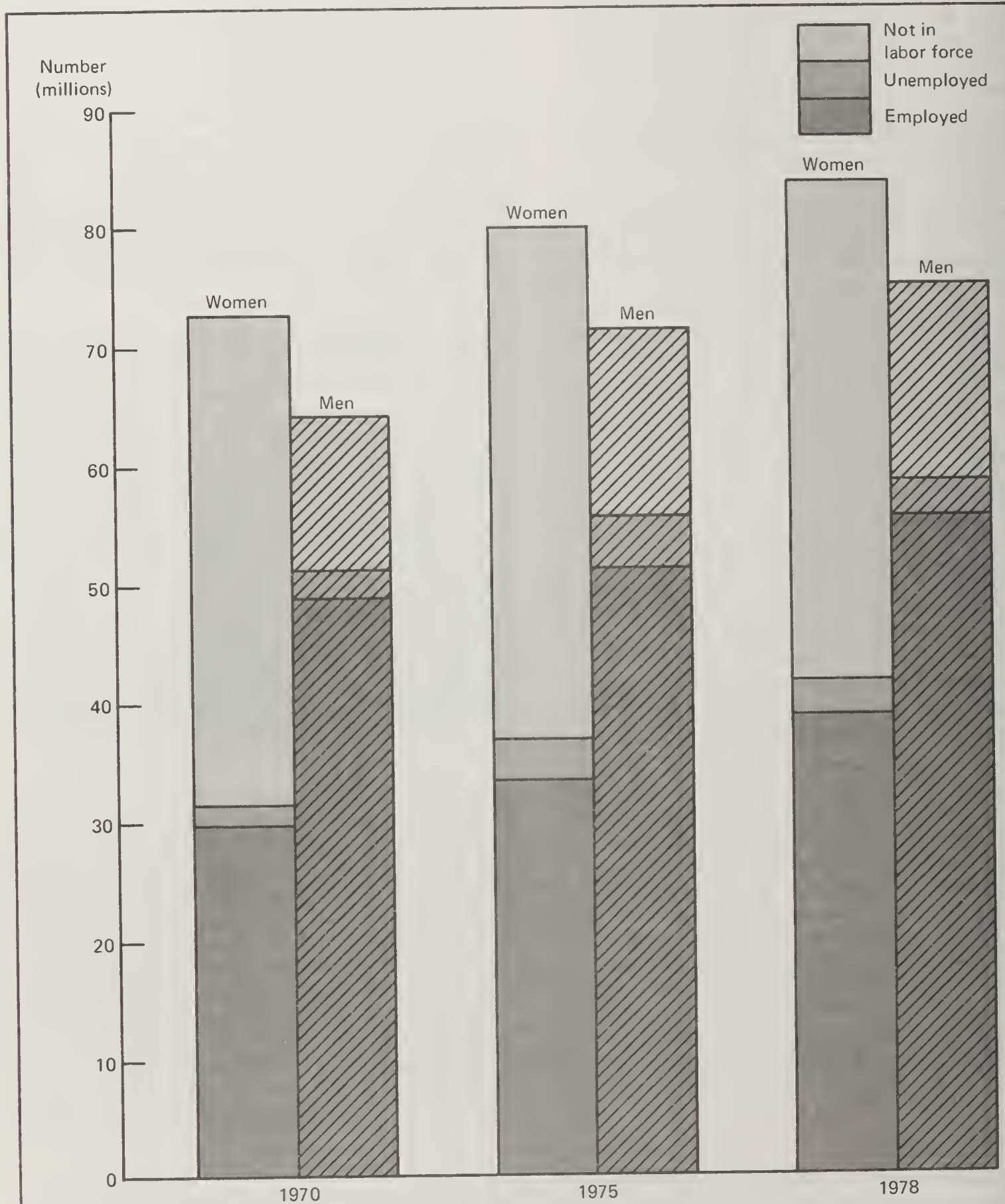
Predicted to offset the above-mentioned declines are substantial gains by 1995 in the number of women and men of prime working age in the labor force. The number of women 25 to 54 years old in the labor force is expected to increase by about 15 million, for a total of about 40 million women of these ages in the work force in 1995; male workers 25 to 54 years old are projected to increase by about 12 million, to about 48 million in 1995. The growth of these groups and an anticipated increase among them of persons whose educational level is generally higher than persons currently in these age groups may be expected to lead to increased productivity in the economy.

Women in the military. The preceding paragraphs are mostly concerned with the changing role of women in the civilian labor force. A view of the changing role of women in the Armed Forces is provided in table 6-10. This table reveals that the number of women in the Armed Forces nearly tripled from 1970 to 1977, despite a more than 30 percent drop during this period in the overall number of military personnel. By 1977, nearly 6 percent of military personnel were women (119,000 out of about 2.1 million), compared with about 1.4 percent in 1970 (42,000 out of 3.1 million). Most of the gains for women occurred among enlisted personnel (an increase of 76,000) rather than among officers (an increase of only 2,000), so that the proportion of officers among military women fell from 1 out of 3 in 1970 to 1 out of 8 in 1977. Women, however, constituted about the same proportion of all officers in 1977 (5.4 percent) as they did of all enlisted personnel (5.8 percent).

FIGURE 6-1.

Employment Status, by Sex: Annual Averages for 1970, 1975, and 1978

(Civilian noninstitutional population 16 years and over)



Source: U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 26, No. 1; Vol. 22, No. 7; and Vol. 17, No. 7.

Table 6-1. Labor Force, by Age and Sex: Annual Averages for 1978, 1975, and 1970

(Numbers in thousands. Noninstitutional population 16 years and over. For meaning of symbols, see text)

Age and sex	Number in labor force			Change, 1970-78		Age and sex	Number in labor force			Change, 1970-78	
	1978	1975	1970	Number	Percent		1978	1975	1970	Number	Percent
Total, 16 years and over:						35 to 44 years:					
Women.....	42,002	37,087	31,560	10,442	33.1	Women.....	7,645	6,495	5,971	1,674	28.0
Men.....	60,535	57,706	54,343	6,192	11.4	Men.....	11,270	10,583	10,818	452	4.2
Ratio: women/men	0.69	0.64	0.58	(X)	(X)	Ratio: women/men	0.68	0.61	0.55	(X)	(X)
16 to 19 years:						45 to 54 years:					
Women.....	4,482	4,059	3,250	1,232	37.9	Women.....	6,782	6,667	6,533	249	3.8
Men.....	5,383	5,127	4,395	988	22.5	Men.....	10,161	10,464	10,487	-326	-3.1
Ratio: women/men	0.83	0.79	0.74	(X)	(X)	Ratio: women/men	0.67	0.64	0.62	(X)	(X)
20 to 24 years:						55 to 64 years:					
Women.....	6,926	6,116	4,893	2,033	41.5	Women.....	4,469	4,244	4,153	316	7.6
Men.....	8,811	8,186	7,378	1,433	19.4	Men.....	7,088	6,984	7,127	-39	-1.0
Ratio: women/men	0.79	0.75	0.66	(X)	(X)	Ratio: women/men	0.63	0.61	0.58	(X)	(X)
25 to 34 years:						65 years and over:					
Women.....	10,580	8,473	5,704	4,876	85.5	Women.....	1,120	1,033	1,056	64	6.1
Men.....	15,900	14,656	11,974	3,926	32.8	Men.....	1,923	1,906	2,164	-241	-11.1
Ratio: women/men	0.67	0.58	0.48	(X)	(X)	Ratio: women/men	0.58	0.54	0.49	(X)	(X)

Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 26, No. 1; Vol. 22, No. 7; and Vol. 17, No. 7.

Table 6-2. Labor Force Participation Rates, by Age and Sex: Annual Averages for 1978, 1975, and 1970

(Numbers in thousands. Noninstitutional population 16 years and over. For meaning of symbols, see text)

Age and sex	1978		1975		1970		Percentage-point change, 1970-78 ²
	Noninstitutional population	Labor force participation rate ¹	Noninstitutional population	Labor force participation rate ¹	Noninstitutional population	Labor force participation rate ¹	
Total, 16 years and over:							
Women.....	83,890	50.1	79,955	46.4	72,774	43.4	6.7
Men.....	77,169	78.4	73,494	78.5	67,409	80.6	-2.2
Ratio: women/men ³	(X)	0.64	(X)	0.59	(X)	0.54	(0.10)
16 to 19 years:							
Women.....	8,296	54.0	8,236	49.3	7,380	44.0	10.0
Men.....	8,475	63.5	8,412	60.9	7,531	58.4	5.1
Ratio: women/men ³	(X)	0.85	(X)	0.81	(X)	0.75	(0.10)
20 to 24 years:							
Women.....	10,107	68.5	9,519	64.3	8,472	57.8	10.7
Men.....	10,121	87.1	9,535	85.9	8,520	86.6	0.5
Ratio: women/men ³	(X)	0.79	(X)	0.75	(X)	0.67	(0.12)
25 to 34 years:							
Women.....	17,018	62.2	15,505	54.6	12,676	45.0	17.2
Men.....	16,642	95.5	15,338	95.5	12,396	96.6	-1.1
Ratio: women/men ³	(X)	0.65	(X)	0.57	(X)	0.47	(0.18)
35 to 44 years:							
Women.....	12,406	61.6	11,635	55.8	11,681	51.1	10.5
Men.....	11,763	95.8	11,051	95.8	11,157	97.0	-1.2
Ratio: women/men ³	(X)	0.64	(X)	0.58	(X)	0.53	(0.11)
45 to 54 years:							
Women.....	11,883	57.1	12,208	54.6	12,008	54.4	2.7
Men.....	11,126	91.3	11,362	92.1	11,124	94.3	-3.0
Ratio: women/men ³	(X)	0.63	(X)	0.59	(X)	0.58	(0.05)
55 to 64 years:							
Women.....	10,785	41.4	10,347	41.0	9,649	43.0	-1.6
Men.....	9,648	73.5	9,216	75.8	8,591	83.0	-9.5
Ratio: women/men ³	(X)	0.56	(X)	0.54	(X)	0.52	(0.04)
65 years and over:							
Women.....	13,395	8.4	12,506	8.3	10,907	9.7	-1.3
Men.....	9,394	20.5	8,779	21.7	8,089	26.8	-6.3
Ratio: women/men ³	(X)	0.41	(X)	0.38	(X)	0.36	(0.05)

¹Number in labor force as percent of total noninstitutional population in the specific group.

²Differences between labor force participation rates, except figures in parentheses which are differences between women/men ratios.

³Ratios of labor force participation rates.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 26, No.1; Vol. 22, No. 7; and Vol. 17, No. 7.

Table 6-3. Civilian Labor Force Participation Rates, by Years of School Completed and Sex: 1978, 1975, and 1970

Numbers in thousands. Civilian noninstitutional population 18 years and over. For meaning of symbols, see text)

Years of school completed and sex	1978		1975 ^r		1970		Percentage-point change, 1970-78 ²
	Civilian noninstitutional population	Civilian labor force participation rate ¹	Civilian noninstitutional population	Civilian labor force participation rate ¹	Civilian noninstitutional population	Civilian labor force participation rate ¹	
NOT A HIGH SCHOOL GRADUATE							
Women.....	25,652	32.4	26,339	31.6	27,862	33.0	-0.6
Men.....	22,522	63.4	23,186	65.2	25,134	72.6	-9.2
Ratio: women/men ³	(X)	0.51	(X)	0.48	(X)	0.45	(0.06)
HIGH SCHOOL GRADUATE							
Women.....	32,617	55.9	31,007	52.5	27,186	50.3	5.6
Men.....	24,109	85.7	22,716	87.6	19,031	90.1	-4.4
Ratio: women/men ³	(X)	0.65	(X)	0.60	(X)	0.56	(0.09)
TO 3 YEARS OF COLLEGE							
Women.....	12,144	57.1	10,441	53.5	8,142	48.6	9.1
Men.....	11,917	81.8	10,407	81.3	8,163	80.6	1.2
Ratio: women/men ³	(X)	0.71	(X)	0.66	(X)	0.60	(0.11)
OR MORE YEARS OF COLLEGE							
Women.....	8,853	66.1	7,558	64.1	5,405	59.7	6.4
Men.....	12,044	90.1	10,496	90.4	7,683	90.2	-0.1
Ratio: women/men ³	(X)	0.73	(X)	0.71	(X)	0.66	(0.07)

^rRevised.

¹Number in civilian labor force as percent of civilian noninstitutional population in the specific group.

²Differences between civilian labor force participation rates, except figures in parentheses which are differences between women/men ratios.

³Ratios of civilian labor force participation rates.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, Nos. 186 and 125; and U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 6-4. Civilian Labor Force, by Marital Status and Sex: 1978, 1975, and 1970

(Numbers in thousands. Civilian noninstitutional population 16 years and over for 1978 and 1975; noninstitutional population 16 years and over excluding members of the Armed Forces living in barracks for 1970. For meaning of symbols, see text)

Marital status and sex	Number in labor force			Percent change, 1970-78	Marital status and sex	Number in labor force			Percent change, 1970-78
	1978	1975 ^r	1970			1978	1975 ^r	1970	
TOTAL, 16 YEARS AND OVER					DIVORCED				
Women.....	40,971	36,496	31,233	31.2	Women.....	3,888	2,881	1,927	101.8
Men.....	57,466	54,812	51,621	11.3	Men.....	2,711	1,953	1,200	125.9
Ratio: women/men.....	0.71	0.67	0.61	(X)	Ratio: women/men.....	1.43	1.48	1.61	(X)
NEVER MARRIED					WIDOWED				
Women.....	10,222	8,433	6,965	46.8	Women.....	2,269	2,385	2,542	-10.7
Men.....	13,978	12,124	9,545	46.4	Men.....	567	608	673	-15.8
Ratio: women/men.....	0.73	0.70	0.73	(X)	Ratio: women/men.....	4.00	3.92	3.78	(X)
MARRIED, SPOUSE PRESENT					MARRIED, SPOUSE ABSENT				
Women.....	22,789	21,143	18,377	24.0	Women.....	1,802	1,653	1,422	26.7
Men.....	38,507	38,686	39,138	-1.6	Men.....	1,703	1,441	1,065	59.9
Ratio: women/men.....	0.59	0.55	0.47	(X)	Ratio: women/men.....	1.06	1.15	1.34	(X)
OTHER MARITAL STATUS ¹									
Women.....	7,960	6,919	5,891	35.1					
Men.....	4,980	4,002	2,938	69.5					
Ratio: women/men.....	1.60	1.73	2.01	(X)					

^rRevised.

¹Includes divorced, widowed, and married, spouse absent.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, Nos. 183 and 130; and U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

**Table 6-5. Civilian Labor Force Participation Rates, by Marital Status and Sex:
1978, 1975, and 1970**

(Numbers in thousands. Noninstitutional population 16 years and over excluding members of the Armed Forces living in barracks for 1978 and 1975; total population 16 years and over excluding members of the Armed Forces living in barracks for 1970. For meaning of symbols, see text)

Marital status and sex	1978		1975 ^r		1970		Percentage-point change, 1970-78 ³
	Population	Civilian labor force participation rate ¹	Population	Civilian labor force participation rate ¹	Population ²	Civilian labor force participation rate ¹	
TOTAL, 16 YEARS AND OVER							
Women.....	83,374	49.1	79,453	45.9	73,261	42.6	6.5
Men.....	75,688	76.8	70,996	77.2	66,193	78.0	-1.2
Ratio: women/men ⁴	(X)	0.64	(X)	0.59	(X)	0.55	(0.9)
NEVER MARRIED							
Women.....	16,891	60.5	14,854	56.8	13,141	53.0	7.5
Men.....	20,287	69.2	18,139	66.8	15,722	60.7	8.5
Ratio: women/men ⁴	(X)	0.87	(X)	0.85	(X)	0.87	(-)
MARRIED, SPOUSE PRESENT							
Women.....	47,906	47.6	47,623	44.4	45,055	40.8	6.8
Men.....	47,920	81.6	46,727	82.8	45,055	86.9	-5.3
Ratio: women/men ⁴	(X)	0.58	(X)	0.54	(X)	0.47	(0.11)
OTHER MARITAL STATUS⁵							
Women.....	18,577	42.8	16,975	40.8	15,065	39.1	3.7
Men.....	7,481	67.1	6,131	65.3	5,416	54.2	12.9
Ratio: women/men ⁴	(X)	0.64	(X)	0.62	(X)	0.72	(-0.08)
DIVORCED							
Women.....	5,257	74.0	3,996	72.1	2,695	71.5	2.5
Men.....	3,384	80.7	2,525	77.4	1,577	76.1	4.6
Ratio: women/men ⁴	(X)	0.92	(X)	0.93	(X)	0.94	(-0.02)
WIDOWED							
Women.....	10,147	22.4	9,985	23.9	9,640	26.4	-4.0
Men.....	1,861	30.5	1,785	34.0	2,110	31.9	-1.4
Ratio: women/men ⁴	(X)	0.73	(X)	0.70	(X)	0.83	(-0.10)
MARRIED, SPOUSE ABSENT							
Women.....	3,173	56.8	2,994	55.2	2,730	52.1	4.7
Men.....	2,236	77.4	1,821	79.1	1,729	61.6	15.8
Ratio: women/men ⁴	(X)	0.73	(X)	0.70	(X)	0.85	(-0.12)

^rRevised.

¹Number in civilian labor force as percent of population in the specific group.

²Includes the institutional population.

³Differences between labor force participation rates, except figures in parentheses which are differences between women/men ratios.

⁴Ratios of civilian labor force participation rates.

⁵Includes divorced, widowed, and married, spouse absent.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, No. 183 and 130; and U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 6-6. Civilian Labor Force Participation Rates for Ever-Married Women, by Presence and Age of Children: 1978, 1975, and 1970

(Numbers in thousands. Civilian noninstitutional population 16 years and over)

Presence and age of children	1978		1975 ^r		1970		Percentage-point change, 1970-78 ²
	Civilian noninstitutional population	Civilian labor force participation rate ¹	Civilian noninstitutional population	Civilian labor force participation rate ¹	Civilian noninstitutional population	Civilian labor force participation rate ¹	
Married women, husband present.....	47,906	47.6	47,623	44.4	45,055	40.8	6.8
No children under 18.....	23,066	44.7	22,138	43.9	19,366	42.2	2.5
With children under 18.....	24,841	50.2	25,485	44.8	25,689	39.7	10.5
Children 6 to 17 only.....	13,694	57.2	13,355	52.3	12,792	49.2	8.0
Children under 6.....	11,147	41.6	12,130	36.6	12,897	30.3	11.3
Children 3 to 5, none under 3.	4,346	47.9	5,198	42.0	5,228	37.0	10.9
Children under 3.....	6,800	37.6	6,933	32.5	7,669	25.8	11.8
Other ever-married women ³ ...	18,577	42.8	16,976	40.8	15,065	39.1	3.7
No children under 18.....	13,845	34.4	12,583	33.2	11,900	33.4	1.0
With children under 18.....	4,733	67.7	4,393	62.4	3,165	60.6	7.1
Children 6 to 17 only.....	3,217	71.2	2,670	67.1	1,900	67.3	3.9
Children under 6.....	1,515	59.9	1,723	55.1	1,265	50.7	9.2
Children 3 to 5, none under 3.	811	63.9	930	59.8	590	58.8	5.1
Children under 3.....	706	55.5	794	49.6	675	43.6	11.9

^rRevised.

¹Number in civilian labor force as percent of civilian noninstitutional population in the specific group.

²Differences between civilian labor force participation rates.

³Includes divorced, widowed, and married, husband absent.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, Nos. 183 and 130; and U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 6-7. Part-Time Workers, by Age and Sex: Annual Averages for 1978, 1975, and 1970

(Numbers in thousands. Civilian noninstitutional population 16 years and over. Part-time workers are persons working 1 to 34 hours during the Current Population Survey reference week. For meaning of symbols, see text)

Age and sex	1978	1975	1970	Percent change, 1970-78
Total, 16 years and over:				
Women.....	11,875	10,765	8,758	35.6
Men.....	6,442	6,500	5,380	19.7
Ratio: women/men.....	1.84	1.66	1.63	(X)
16 to 19 years:				
Women.....	2,534	2,299	1,725	46.9
Men.....	2,495	2,349	2,069	20.6
Ratio: women/men.....	1.02	0.98	0.83	(X)
20 years and over:				
Women.....	9,341	8,465	7,034	32.8
Men.....	3,948	4,150	3,311	19.2
Ratio: women/men.....	2.37	2.04	2.12	(X)

Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 26, No. 1; Vol. 22, No. 7; and Vol. 17, No. 7.

**Table 6-8. Civilian Labor Force, Number Unemployed, and Unemployment Rates, by Age and Sex:
Annual Averages for 1978, 1975, and 1970**

(Numbers in thousands. Civilian noninstitutional population 16 years and over)

Age and sex	1978	1975	1970	Age and sex	1978	1975	1970
CIVILIAN LABOR FORCE				NUMBER UNEMPLOYED--Con.			
Total, 16 years and over:				20 years and over:			
Women.....	41,878	36,998	31,520	Women.....	2,236	2,649	1,346
Men.....	58,542	55,615	51,195	Men.....	2,252	3,428	1,636
Ratio: women/men.....	0.72	0.67	0.62	Ratio: women/men.....	0.99	0.77	0.82
6 to 19 years:				UNEMPLOYMENT RATE			
Women.....	4,462	4,038	3,241	Total, 16 years and over:			
Men.....	5,078	4,760	4,006	Women.....	7.2	9.3	5.9
Ratio: women/men.....	0.88	0.85	0.81	Men.....	5.2	7.9	4.4
0 years and over:				Ratio: women/men ¹	1.38	1.18	1.34
Women.....	37,416	32,959	28,279	16 to 19 years:			
Men.....	53,464	50,855	47,189	Women.....	17.0	19.7	15.6
Ratio: women/men.....	0.70	0.65	0.60	Men.....	15.7	20.1	15.0
NUMBER UNEMPLOYED				Ratio: women/men ¹	1.08	0.98	1.04
Total, 16 years and over:				20 years and over:			
Women.....	2,996	3,445	1,853	Women.....	6.0	8.0	4.8
Men.....	3,051	4,385	2,235	Men.....	4.2	6.7	3.5
Ratio: women/men.....	0.98	0.79	0.83	Ratio: women/men ¹	1.43	1.19	1.37
6 to 19 years:							
Women.....	760	795	506				
Men.....	799	957	599				
Ratio: women/men.....	0.95	0.83	0.84				

¹Ratios of unemployment rates.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 26, No. 1; Vol. 22, No. 7; and Vol. 17, No. 7.

Table 6-9. Projected Size of Civilian Labor Force, by Age and Sex: 1978 (Actual), 1985, 1990, and 1995

(Numbers in thousands. Civilian noninstitutional population 16 years and over)

Age and sex	Number in civilian labor force				Projected change, 1978-95	
	1978 (actual)	1985	1990	1995	Number	Percent
Total, 16 years and over:						
Women.....	41,878	49,946	54,251	56,039	14,161	33.8
Men.....	58,542	63,007	65,115	66,454	7,912	13.5
16 to 19 years:						
Women.....	4,462	4,192	4,139	3,766	-696	-15.6
Men.....	5,078	4,374	4,199	3,848	-1,230	-24.2
20 to 24 years:						
Women.....	6,860	7,742	7,086	6,602	-258	-3.8
Men.....	8,063	8,091	6,957	6,397	-1,666	-20.7
25 to 34 years:						
Women.....	10,546	14,607	16,063	15,057	4,511	42.8
Men.....	15,284	17,925	18,401	16,980	1,696	11.1
35 to 44 years:						
Women.....	7,641	11,079	13,820	15,667	8,026	105.0
Men.....	10,986	14,218	16,593	18,173	7,187	65.4
45 to 54 years:						
Women.....	6,781	6,746	7,830	9,672	2,891	42.6
Men.....	10,122	9,681	10,851	13,196	3,074	30.4
55 to 64 years:						
Women.....	4,468	4,536	4,270	4,277	-191	-4.3
Men.....	7,087	6,953	6,383	6,206	-881	-12.4
65 years and over:						
Women.....	1,120	1,044	1,043	998	-122	-10.9
Men.....	1,923	1,765	1,731	1,654	-269	-14.0

Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 26, No. 1, and unpublished moderate growth projections.

Table 6-10. Persons in the Armed Forces, by Officer-Enlisted Status, for Total Military and Women: 1977, 1975, and 1970

(Numbers in thousands. For meaning of symbols, see text)

Officer-enlisted status and sex	1977	1975	1970	Percent change, 1970-77
Armed Forces, total.....	2,074	2,128	3,066	-32.4
Women.....	119	97	42	183.3
Percent of Armed Forces.....	5.7	4.6	1.4	(X)
Officers, total.....	276	292	402	-31.3
Women.....	15	14	13	15.4
Percent of officers.....	5.4	4.6	3.3	(X)
Enlisted personnel, total.....	1,798	1,836	2,664	-32.5
Women.....	104	83	28	271.4
Percent of enlisted personnel.....	5.8	4.5	1.1	(X)

Note: Persons in the Armed Forces as of June 30, except 1977, as of September 30. Includes National Guard, Reserve, and retired regular personnel on extended or continuous active duty; excludes Coast Guard. Military cadets, Naval Academy midshipmen, Air Force Academy cadets, and other officer candidates are included under enlisted personnel. See also Bureau of the Census, Historical Statistics, Colonial Times to 1970, series Y 904-916.

Source: U.S. Department of Defense, Office of the Secretary, Selected Manpower Statistics, annual, and unpublished data.

Chapter 7

Work Experience



Workers. As a result of movements into and out of the labor force, the number of women and men who work at least part of any given year is greater than the number who work at any one point in time. About 46 million women (nearly 56 percent of all women 16 years and over) and about 61 million men (about 81 percent of all men 16 years and over) had at least some work experience during 1977, whereas, on the average, about 40 million women and 57 million men were in the labor force at any one time during that year (table 7-1).

Between 1970 and 1977, the number of women with annual work experience increased by 20 percent, and the number of comparable men rose by 11 percent. The large increase in the number of women with work experience is, at least in part, a function of their population growth and of their significantly increased labor force participation rates.

Labor force attachment. In spite of this increase for women, the data on annual work experience reveal that the labor force attachment of women, defined in terms of weeks worked during the year and usual hours worked per week, changed little over the 1970-77 period and continued to be different from that of men (table 7-1 and figure 7-1). The proportion of female workers at full-time jobs¹ for under 40 weeks (about 27 percent) and the proportion who worked at part-time jobs² (about 33 percent) were roughly the same in 1977 as in 1970. Furthermore, the distributions of part-time and full-time female workers by number of weeks worked during the year, have not changed radically since 1970. Thus in 1977, women were more than twice as likely as men to work part time, and while 49 percent of female workers held full-time jobs for 40 or more weeks, nearly 73 percent of male workers were employed full time for 40 or more weeks.

A substantial number of women (about 22 million) and men (about 19 million) worked fewer than 50 weeks in 1977. A distribution of these part-year workers, by major reason for working part year, is presented in table 7-2. The largest proportion of women (44 percent) gave home

¹ Full time is defined as 35 hours or more per week.

² Part time is defined as 1 to 34 hours per week.

and family responsibilities as the major reason for part-year work, whereas unemployment was the major reason reported by the largest proportion of men (39 percent). Even among women, however, unemployment becomes more important and home and family responsibilities less important as the weeks women spend in the work force increase. About 36 percent of women who worked at full-time jobs for 40 to 49 weeks reported unemployment as the major constraint on their work experience.

Age and marital status. Whether persons will gain work experience during a year, and whether that experience will be in full- or part-time jobs, are related to their age and marital status. Sixty percent or more of the women in the five age

groups between 16 and 54 years old worked in 1977, compared with 48 percent of the women 55 to 64 years old and only 12 percent of the women 65 years old and over. Women 20 to 24 years had the largest proportion with work experience (about 77 percent) (table 7-3). Comparisons of work experience by marital status, as shown in table 7-4, reveal that about 70 percent of never-married women had work experience in 1977, compared with 55 percent of married women living with their husbands and about 46 percent of women of other marital statuses combined (married, spouse absent; divorced; and widowed). The latter marital group had the highest proportion of workers with full-time jobs, about 77 percent; never-married women had the highest proportion of workers with part-time jobs, about 39 percent.

FIGURE 7-1.
Annual Work Experience, by Sex and Extent of Work Experience:
1970, 1975, and 1977
(Persons 16 years and over)

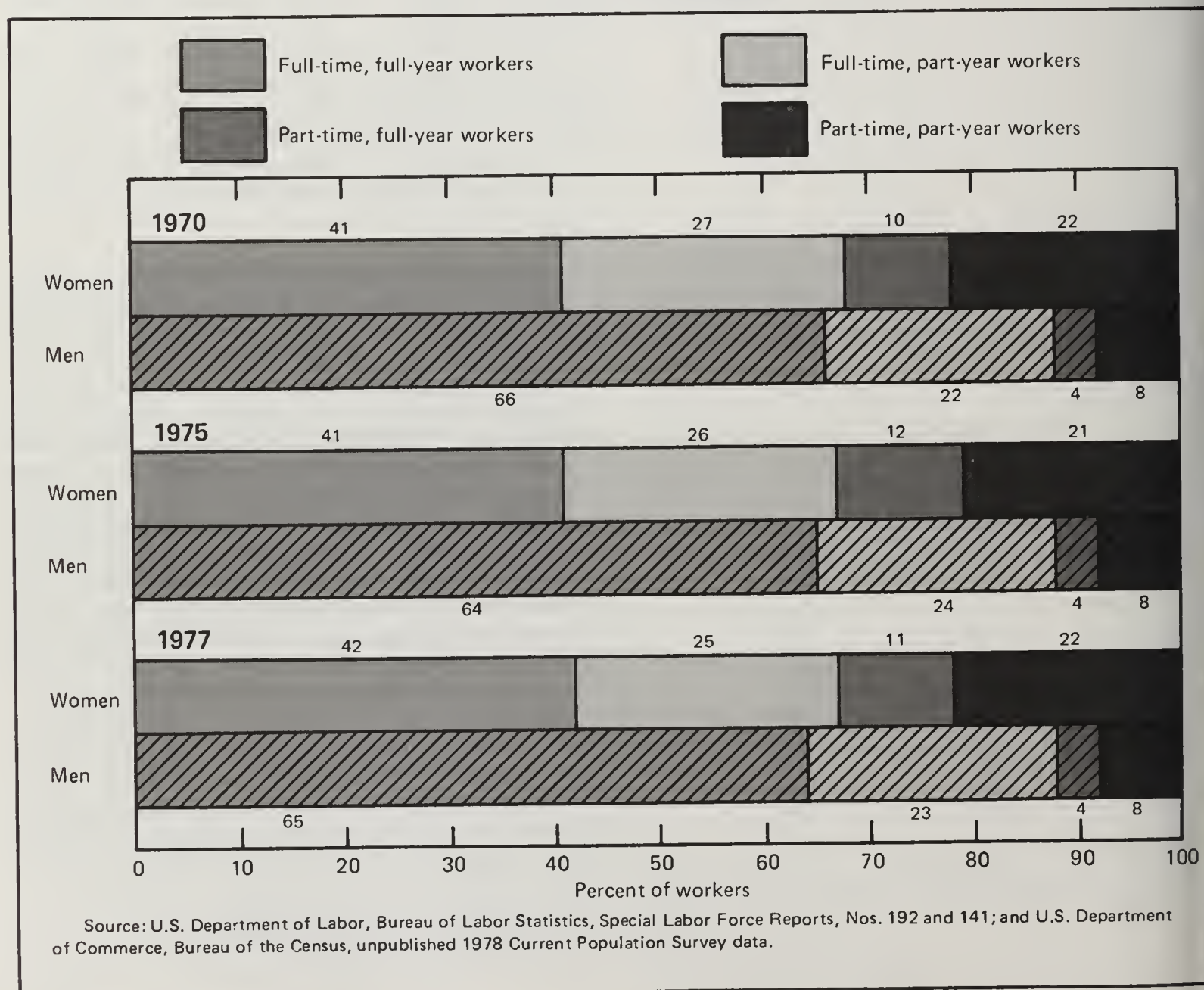


Table 7-1. Annual Work Experience, by Sex: 1977, 1975, and 1970

(Numbers in thousands. Persons as of the following year. Civilian noninstitutional population 16 years and over)

Work experience	1977		1975		1970	
	Women	Men	Women	Men	Women	Men
TOTAL, 16 YEARS AND OVER						
Number.....	83,374	74,814	80,834	72,346	73,657	65,296
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
Worked during year.....	55.6	81.2	53.0	80.7	52.5	84.1
Did not work during year.....	44.4	18.8	47.0	19.3	47.5	15.9
TOTAL WORKED DURING YEAR						
Number.....	46,379	60,717	42,881	58,359	38,704	54,919
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
Worked at full-time jobs ¹	67.0	87.5	67.0	87.6	67.8	87.6
40 or more weeks.....	48.9	72.5	47.7	71.3	47.3	74.0
50 to 52 weeks.....	42.1	64.7	41.4	63.9	40.7	66.1
Worked at part-time jobs ²	33.0	12.5	33.0	12.4	32.1	12.4
40 or more weeks.....	15.1	5.6	15.6	5.7	13.5	5.6
50 to 52 weeks.....	11.2	4.1	11.8	4.4	10.0	4.4
WORKED AT FULL-TIME JOBS¹						
Number.....	31,077	53,112	28,746	51,098	26,261	48,082
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
50 to 52 weeks.....	62.9	74.0	61.7	73.0	60.0	75.5
48 and 49 weeks.....	3.0	3.0	3.0	2.7	2.9	3.1
40 to 47 weeks.....	7.0	5.9	6.6	5.8	6.8	5.9
27 to 39 weeks.....	8.6	6.3	8.7	6.8	9.1	5.9
14 to 26 weeks.....	9.6	5.7	10.2	6.3	10.6	4.8
1 to 13 weeks.....	8.9	5.0	9.9	5.4	10.5	4.8
WORKED AT PART-TIME JOBS²						
Number.....	15,302	7,603	14,135	7,261	12,443	6,837
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
50 to 52 weeks.....	33.8	32.7	35.7	35.1	31.1	35.6
48 and 49 weeks.....	3.2	3.5	3.2	3.3	3.1	3.3
40 to 47 weeks.....	8.9	8.6	8.4	7.8	7.8	6.5
27 to 39 weeks.....	13.2	12.4	13.8	12.9	12.4	11.4
14 to 26 weeks.....	18.2	19.3	16.8	18.4	19.1	18.0
1 to 13 weeks.....	22.7	23.6	22.2	22.6	26.5	25.2

¹Full-time jobs are defined as 35 hours or more per week in a majority of the weeks worked.²Part-time jobs are defined as 1 to 34 hours per week in a majority of the weeks worked.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, Nos. 192 and 141; and U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 7-2. Major Reason for Part-Year Work, by Annual Work Experience and Sex: 1977

(Numbers in thousands. Persons as of 1978. Civilian noninstitutional population 16 years and over. For meaning of symbols, see text)

Sex and work experience	Total part-year workers ¹		Major reason for part-year work						
	Number	Percent	Unemployment	Illness or disability ²	Home and family responsibilities	Going to school	Retirement	In Armed Forces	Other reasons ³
WOMEN									
Total, 16 years and over....	21,666	100.0	19.7	6.7	44.2	20.9	1.1	-	7.3
Worked at full-time jobs ⁴	11,537	100.0	26.5	8.5	40.1	15.5	1.2	-	8.2
1 to 13 weeks.....	2,763	100.0	14.7	4.3	48.4	28.5	1.4	-	2.7
14 to 26 weeks.....	2,984	100.0	24.5	5.8	44.0	18.8	1.8	-	5.0
27 to 39 weeks.....	2,663	100.0	29.4	9.1	39.5	12.8	1.4	-	7.8
40 to 49 weeks.....	3,127	100.0	36.2	14.2	29.7	3.2	0.4	-	16.3
Worked at part-time jobs ⁵	10,129	100.0	11.9	4.8	48.9	27.0	1.0	-	6.4
1 to 26 weeks.....	6,251	100.0	8.8	3.7	50.9	33.2	1.1	-	2.1
27 to 49 weeks.....	3,878	100.0	16.9	6.5	45.6	16.9	0.7	-	13.3
MEN									
Total, 16 years and over....	18,924	100.0	38.5	9.5	1.3	28.4	6.2	0.9	15.2
Worked at full-time jobs ⁴	13,805	100.0	45.8	10.5	1.5	20.2	4.4	1.1	16.6
1 to 13 weeks.....	2,680	100.0	21.5	7.1	0.8	52.1	9.0	1.6	7.9
14 to 26 weeks.....	3,034	100.0	43.7	9.5	1.3	26.2	6.2	2.3	10.8
27 to 39 weeks.....	3,354	100.0	56.2	10.0	1.3	12.8	3.8	0.9	15.0
40 to 49 weeks.....	4,737	100.0	53.5	13.4	2.0	3.5	1.1	0.2	26.3
Worked at part-time jobs ⁵	5,119	100.0	18.9	6.8	1.1	50.5	10.9	0.4	11.4
1 to 26 weeks.....	3,259	100.0	14.6	6.0	1.2	59.0	12.0	0.6	6.6
27 to 49 weeks.....	1,860	100.0	26.4	8.3	0.8	35.6	9.0	-	19.9

¹Part-year workers are persons who worked fewer than 50 weeks during the year.

²Excludes paid sick leave from a job (which is counted as time worked) and periods of illness or disability during which the person would not have worked or would not have been in the labor force even if well.

³Includes unpaid vacations, strikes, summer vacations for students, and other reasons.

⁴Full-time jobs are defined as 35 hours or more per week in a majority of the weeks worked.

⁵Part-time jobs are defined as 1 to 34 hours per week in a majority of the weeks worked.

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 7-3. Annual Work Experience, by Age and Sex: 1977 and 1970

(Numbers in thousands. Persons as of the following year. Civilian noninstitutional population 16 years and over)

Sex and work experience	Total, 16 years and over	16 to 19 years	20 to 24 years	25 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 years and over
WOMEN								
With work experience in 1977:								
Number.....	46,379	5,015	7,657	11,480	8,124	7,356	5,146	1,600
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Worked at full-time jobs ¹	67.0	35.6	73.1	75.5	69.4	70.6	69.9	37.5
Worked at part-time jobs ²	33.0	64.4	26.9	24.5	30.6	29.4	30.1	62.4
With work experience in 1970:								
Number.....	38,704	4,353	6,370	7,289	6,772	7,302	5,003	1,615
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Worked at full-time jobs ¹	67.8	37.1	78.0	71.4	69.4	74.2	72.9	44.3
Worked at part-time jobs ²	32.1	62.9	22.0	28.6	30.6	25.8	27.1	55.7
MEN								
With work experience in 1977:								
Number.....	60,717	5,705	8,499	15,233	10,903	10,250	7,675	2,452
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Worked at full-time jobs ¹	87.5	44.2	83.8	95.2	97.4	96.9	93.0	52.4
Worked at part-time jobs ²	12.5	55.8	16.2	4.8	2.6	3.1	7.0	47.6
PERCENT OF POPULATION WITH WORK EXPERIENCE IN 1977								
Women.....	55.6	60.5	76.7	68.1	66.1	61.7	47.9	12.0
Men.....	81.2	69.9	91.1	95.8	95.9	92.2	78.6	26.7
Ratio: women/men ³	0.68	0.87	0.84	0.71	0.69	0.67	0.61	0.45
PERCENT OF POPULATION WITH WORK EXPERIENCE IN 1970								
Women.....	52.5	57.9	73.0	56.5	58.5	60.4	51.2	14.6
Men.....	84.1	73.8	88.9	97.0	97.5	95.6	87.8	35.8
Ratio: women/men ³	0.62	0.82	0.82	0.58	0.60	0.63	0.58	0.41

¹Full-time jobs are defined as 35 hours or more per week in a majority of the weeks worked.²Part-time jobs are defined as 1 to 34 hours per week in a majority of the weeks worked.³Ratios of percentages.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, No. 141; and U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 7-4. Annual Work Experience, by Marital Status and Sex: 1977, 1975, and 1970

(Persons as of the following year. Civilian noninstitutional population 16 years and over)

Work experience, marital status, and sex	1977	1975	1970	Work experience, marital status, and sex	1977	1975	1970
PERCENT OF POPULATION WITH WORK EXPERIENCE				PERCENT OF WORKERS WITH FULL-TIME JOBS³--Continued			
Never married:				Married, spouse present:			
Women.....	69.1	67.6	66.7	Women.....	66.7	67.3	68.4
Men.....	78.4	75.5	76.0	Men.....	94.4	94.6	94.4
Ratio: women/men ¹	0.88	0.90	0.88	Ratio: women/men ¹	0.71	0.71	0.72
Married, spouse present:				Other marital status ² :			
Women.....	54.8	51.7	50.6	Women.....	76.8	76.4	75.7
With no children under 18.....	51.1	49.4	49.9	Men.....	90.8	89.1	88.4
With own children 6 to 17 only..	63.6	59.5	57.7	Ratio: women/men ¹	0.85	0.86	0.86
With own children under 6.....	51.6	47.0	44.3				
Men.....	84.2	84.6	88.0	PERCENT OF WORKERS WITH PART-TIME JOBS⁴			
Ratio: women/men ¹	0.65	0.61	0.58	Never married:			
Other marital status ² :				Women.....	39.4	40.6	39.6
Women.....	45.5	43.9	45.7	Men.....	31.0	32.5	36.9
Men.....	69.4	66.7	65.0	Ratio: women/men ¹	1.27	1.25	1.07
Ratio: women/men ¹	0.66	0.66	0.70	Married, spouse present:			
PERCENT OF WORKERS WITH FULL-TIME JOBS³				Women.....	33.3	32.7	31.6
Never married:				Men.....	5.6	5.5	5.6
Women.....	60.6	59.3	60.4	Ratio: women/men ¹	5.95	5.95	5.64
Men.....	69.0	67.5	63.1	Other marital status ² :			
Ratio: women/men ¹	0.88	0.88	0.96	Women.....	23.2	23.5	24.3
				Men.....	9.2	11.0	11.6
				Ratio: women/men ¹	2.52	2.14	2.09

¹Ratios of percentages.²Includes divorced, widowed, and married, spouse absent.³Full-time jobs are defined as 35 hours or more per week in a majority of the weeks worked.⁴Part-time jobs are defined as 1 to 34 hours per week in a majority of the weeks worked.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, Nos. 192 and 141; and U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Chapter 8



Occupation, Industry, and Women-Owned Businesses

Occupation. The 39 million women employed in 1978 tended to be concentrated within four major occupation groups: 35 percent were clerical workers; 21 percent were service workers, including private household workers; 16 percent were professional, technical, and kindred workers; and 11 percent were operatives, except transport (table 8-1). The remaining 18 percent were dispersed among the other seven major occupation groups. Concentration was also evident at the detailed occupational level. Among professional, technical, and kindred occupations, for example, the majority of women were in teaching and health fields (mostly as elementary and secondary school teachers, registered nurses, dietitians, and therapists). The majority of the women in clerical occupations were working as secretaries, stenographers, typists, bookkeepers, and cashiers. In 1978, women outnumbered men in clerical occupations by nearly 4 to 1—a substantial increase from 1972, when female clerical workers outnumbered men by just over 3 to 1. An influx of women into clerical occupations, coupled with a steadying of male clerical employment between 1972 and 1978, resulted in this increased concentration of women among clerical workers.

Next to clerical occupations, service occupations (such as food services and health services) provided the major source of employment for women in 1978. The approximately 21 percent of all employed women who worked in service occupations during the year constituted 63 percent of all service workers. The growth of women in service occupations, except private household workers, has roughly matched the 25-percent growth in female employment between 1972 and 1978. There was, however, a 19-percent decrease in the almost exclusively female occupation of private household workers, from 1.4 million in 1972 to 1.1 million in 1978.

Although occupational structures change quite slowly over time, there are a few indications that women are moving into some of the occupations traditionally held by men (table 8-1 and figure 8-1). While the total number of employed

women increased 25 percent since 1972, the growth of women in three of the major occupation groups was significantly greater: managers and administrators (67-percent increase), craftworkers (81-percent increase), and laborers, except farm (84-percent increase). Even with these large growth rates, however, there were only 6 female craftworkers and 12 female laborers for every 100 males employed in each of these groups in 1978. Among managers and administrators, there were 21 women for every 100 men in 1972, compared with 30 women for every 100 men in 1978.

Some of the movement of women into occupations traditionally held by men can be seen only at the detailed occupational level. Female accountants, engineering and science technicians, bank officers and financial managers, and stock handlers, for example, have increased proportionally well beyond the general increase in employed women. The number of female farmers and farm managers, in fact, has increased, while the number of men in these two occupations has decreased.

Although the dependence of occupation on educational attainment is well-established, there were significant differences between the occupational structures in 1978 of men and women 25 to 64 years of age with similar educational attainment (table 8-2). Women and men with 4 or more years of college were likely to be in professional, technical, or managerial occupations in 1978, although women were more concentrated than men in professional and technical occupations (66 percent of the employed women, 53 percent of the men) and less concentrated in managerial occupations (9 percent of the women, 25 percent of the men). Most college-educated women who did not enter professional or managerial occupations were employed in clerical occupations (15 percent). College-educated men who did not work in professional or managerial occupations were most likely to be in sales occupations or in clerical or craft occupations. Women high school graduates and women with 1 to 3 years of college were much more likely than women with more education to be employed in clerical work. About 45 percent of employed women with some college (1 to 3 years) were clerical workers—the same percentage as for women with 4 years of high school. Nevertheless, women with some college education were much more likely to be in professional and managerial positions and less likely to be operatives or service workers than those with no college. Women with less than 4 years of high school were overwhelmingly employed as operatives or service workers.

When both husband and wife are employed, the wife is sometimes employed in the same major occupational group as her husband (table 8-3). For example, wives of professional and technical workers were more likely to be employed in professional and technical occupations in 1978 than in any other major occupation group. The corresponding relationship held for clerical and farm workers. For all other major occupation groups, however, wives were most

likely to be employed in clerical occupations, regardless of the major occupations of their husbands.

Industry. The industrial structure of employed women, like their occupational structure, tends to be more concentrated than that of men (table 8-4). Seventy percent of employed women in 1978 were working in 3 of the 12 major industry groups: professional and related services, wholesale and retail trade, and manufacturing. Many of the industry patterns of employed women are related to their occupational patterns. For example, 31 percent of all women employed in 1978 were working in professional and related service industries, outnumbering men in this group by nearly 2 to 1. This is not surprising, considering that women dominated teaching and health-related occupations (except medical practitioners) in 1978. Occupational patterns also underlie the fact that the ratio of women to men in personal service industries was quite high (nearly 3 to 1) in 1978. In contrast, women accounted for only 7 percent of the construction industry, reflecting the relative paucity of women in craft occupations.

Women-owned businesses. In spite of the generally increasing economic activity of women, firms owned by women are still fairly rare. Data for 1972, the most current available, reveal that only about 5 percent of the Nation's firms¹ (about 402,000 out of 8.7 million) were owned by women (table 8-5). Furthermore, about 71 percent of these women-owned businesses were in two major industries: retail trade and selected services. Even in these two industries, women controlled only about 6 percent of all the retail trade firms and about 7 percent of all the selected services firms. In the remaining industries, except for the residual group, "other industries and industries not classified," women owned about 3 percent or fewer of the firms.

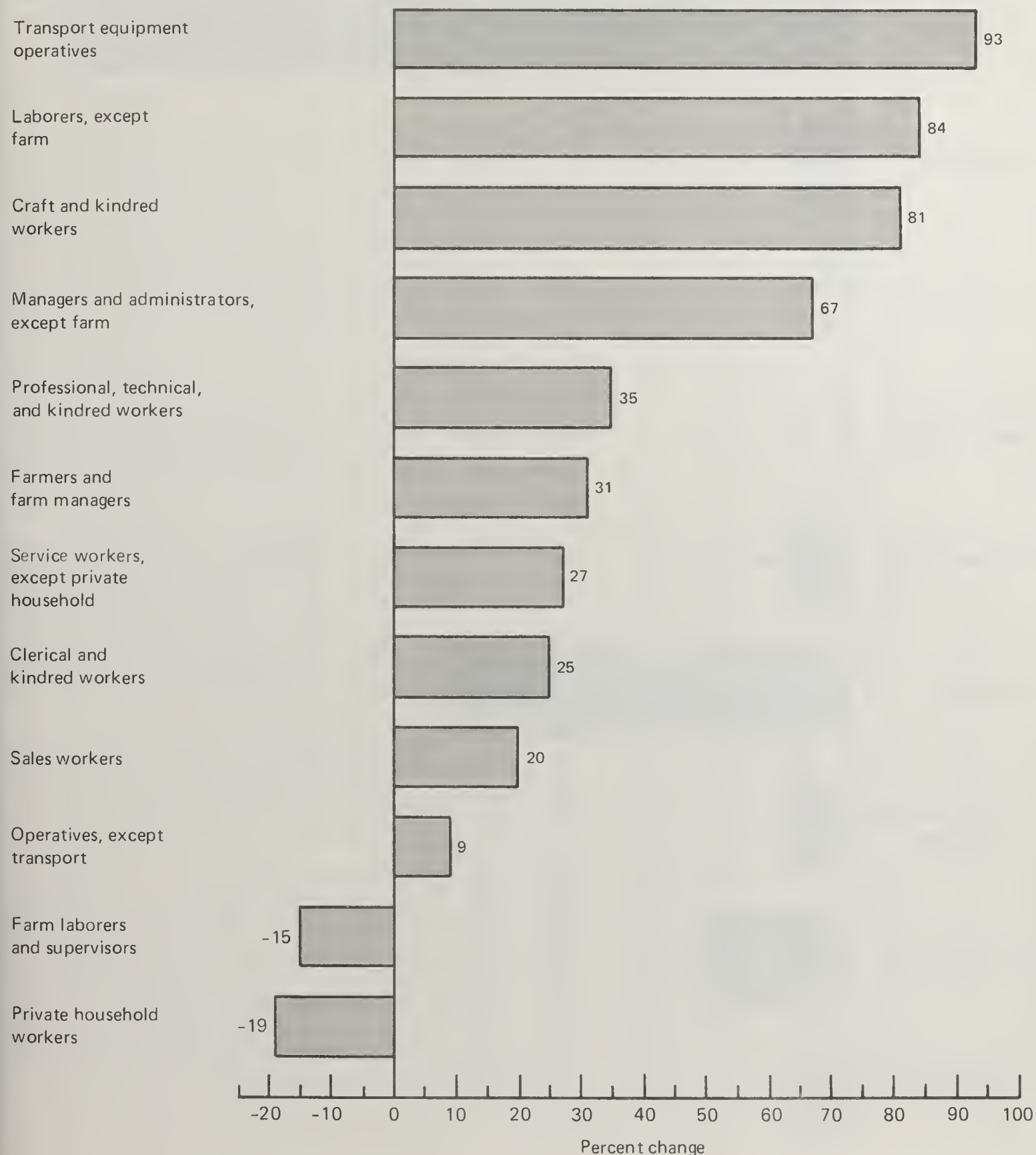
Not only were there few women-owned businesses in 1972, but also the existing ones accounted for only about \$8 billion in receipts, or under 1 percent of the total receipts of all firms. There was no industry division in which women-owned firms had more than about 2 percent of the total receipts for that industry.

Almost all of the firms owned by women (about 98 percent) were organized as sole proprietorships; the remainder were mostly partnerships, with about 0.3 percent being corporations. Although partnerships and corporations taken together constituted only a small fraction of all women-owned firms, they accounted for slightly more than 10 percent of the gross receipts (about 7 and 4 percent, respectively) of such firms (figure 8-2).²

¹ Excludes corporations with more than 10 shareholders, except those which are "closely held."

² See U.S. Department of Commerce, Bureau of the Census, *Women-Owned Businesses, 1972*.

FIGURE 8-1.
Percent Change in Employment of Women, by Major Occupation Group: 1972 to 1978
 (Women 16 years and over)



Source: U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 26, No. 1; Vol. 19, No. 7; and U.S. Department of Commerce, Bureau of the Census, unpublished Current Population Survey data.

FIGURE 8-2.
Receipts of Firms Owned by Women, by Industry: 1972

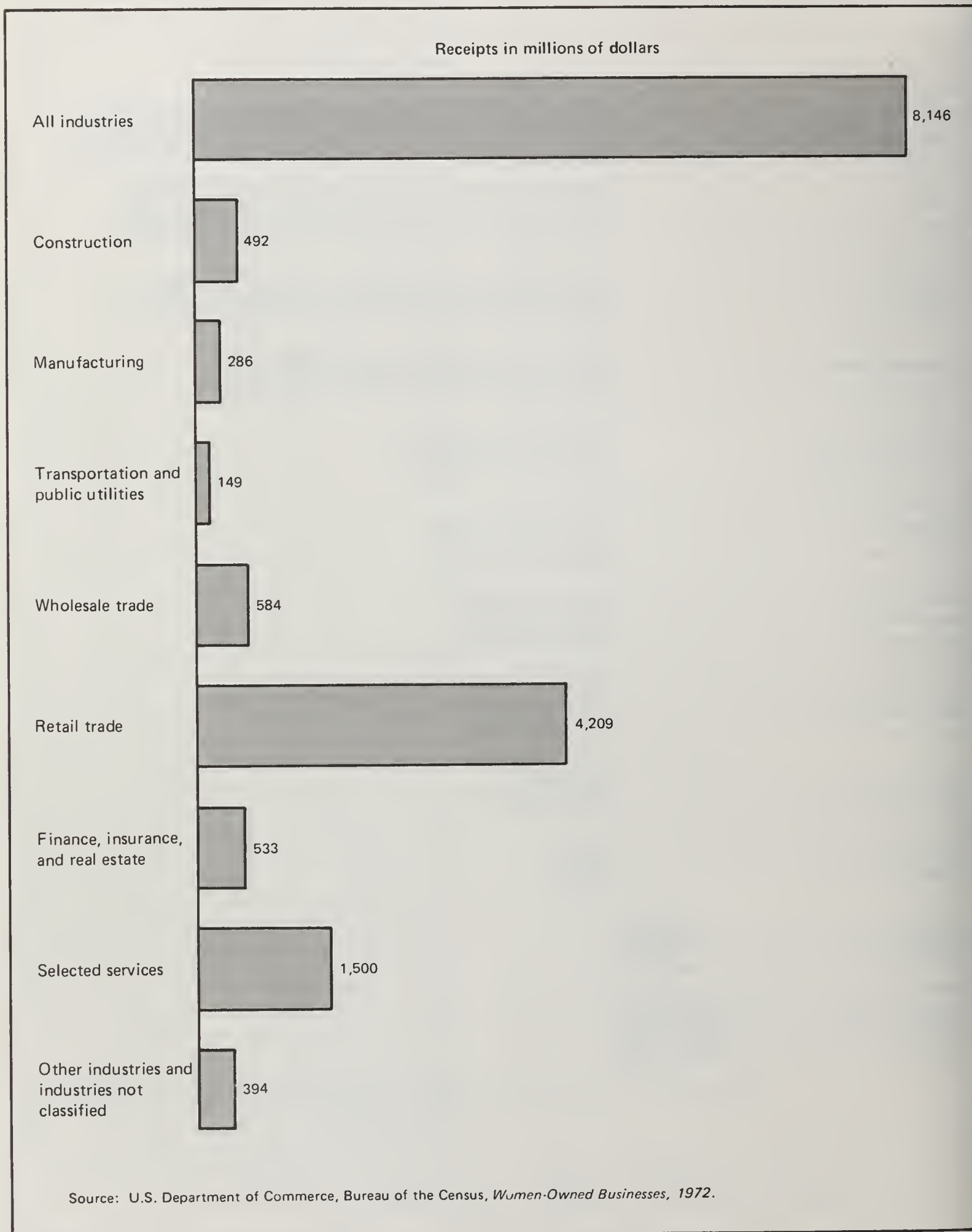


Table 8-1. Occupation of Employed Persons, by Sex: Annual Averages for 1978 and 1972

(Numbers in thousands. Civilian noninstitutional population 16 years and over. For meaning of symbols, see text)

Occupation	1978			1972			Percent change, 1972-78 ¹	
	Women	Men	Ratio: women/men	Women	Men	Ratio: women/men	Women	Men
Total employed.....	38,882	55,491	0.70	31,072	50,630	0.61	25.1	9.6
WHITE-COLLAR WORKERS								
Total.....	24,572	22,634	1.09	18,915	20,175	0.94	29.9	12.2
Professional, technical, and kindred workers.....	6,082	8,163	0.75	4,502	6,957	0.65	35.1	17.3
Accountants.....	293	682	0.43	155	559	0.28	89.0	22.0
Computer specialists.....	99	329	0.30	46	227	0.20	(B)	44.9
Engineers.....	35	1,231	0.03	9	1,093	-	(B)	12.6
Lawyers and judges.....	47	452	0.10	12	307	0.04	(B)	47.2
Librarians, archivists, and curators.....	163	38	4.29	129	29	4.45	26.4	(B)
Life and physical scientists.....	49	224	0.22	23	207	0.11	(B)	8.2
Personnel and labor relations workers.....	177	228	0.78	96	214	0.45	84.4	6.5
Physicians, dentists, and related practitioners..	79	677	0.12	58	566	0.10	(B)	19.6
Registered nurses, dietitians, and therapists....	1,255	96	13.07	879	70	12.56	42.8	(B)
Health technologists and technicians.....	353	145	2.43	219	97	2.26	61.2	49.5
Religious workers.....	48	277	0.17	32	260	0.12	(B)	6.5
Social scientists.....	86	169	0.51	30	111	0.27	(B)	52.3
Social and recreation workers.....	308	197	1.56	195	160	1.22	57.9	23.1
Teachers, college and university.....	190	372	0.51	129	332	0.39	47.3	12.0
Teachers, except college and university.....	2,124	868	2.45	1,988	853	2.33	6.8	1.8
Engineering and science technicians.....	132	853	0.15	75	753	0.10	76.0	13.3
Writers, artists, and entertainers.....	424	768	0.55	284	613	0.46	49.3	25.3
All other professional, technical, and kindred workers.....	220	557	0.39	143	506	0.28	53.8	10.1
Managers and administrators, except farm.....	2,361	7,744	0.30	1,410	6,621	0.21	67.4	17.0
Bank officers and financial managers.....	174	399	0.44	81	347	0.23	114.8	15.0
Health administrators.....	85	99	0.86	55	62	0.89	(B)	(B)
Office managers, n.e.c. ²	241	130	1.85	132	183	0.72	82.6	-29.0
Officials and administrators, public administration, n.e.c. ²	104	316	0.33	63	247	0.26	(B)	27.9
Restaurant, cafeteria, and bar managers.....	199	390	0.51	160	335	0.48	24.4	16.4
Sales managers and department heads, retail trade	128	215	0.60	81	215	0.38	58.0	-
Sales managers, except retail trade.....	23	307	0.07	8	266	0.03	(B)	15.4
All other managers and administrators.....	1,407	5,888	0.24	830	4,966	0.17	69.5	18.6
Sales workers.....	2,666	3,285	0.81	2,226	3,127	0.71	19.8	5.1
Demonstrators, hucksters, and peddlers.....	255	45	5.67	228	68	3.35	11.8	(B)
Insurance agents, brokers, and underwriters.....	111	437	0.25	51	389	0.13	(B)	12.3
Real estate agents and brokers.....	250	304	0.82	128	221	0.58	95.3	37.6
Sales clerks, retail trade.....	1,671	667	2.51	1,617	731	2.21	3.3	-8.8
All other sales workers.....	379	1,832	0.21	202	1,718	0.12	87.6	6.6
Clerical and kindred workers.....	13,463	3,442	3.91	10,777	3,470	3.11	24.9	-0.8
Bank tellers.....	411	38	10.82	252	37	6.81	63.1	(B)
Bookkeepers.....	1,659	171	9.70	1,393	191	7.29	19.1	-10.5
Cashiers.....	1,222	180	6.79	864	133	6.50	41.4	35.3
Estimators and investigators, n.e.c. ²	241	209	1.15	151	197	0.77	59.6	6.1
Mail carriers, post office.....	30	226	0.13	18	252	0.07	(B)	-10.3
Office machine operators.....	614	213	2.88	481	193	2.49	27.7	10.4
Receptionists.....	570	18	31.67	423	13	32.54	34.8	(B)
Secretaries, stenographers, and typists.....	4,654	74	62.89	4,016	79	50.84	15.9	-6.3
Shipping and receiving clerks.....	105	355	0.30	67	384	0.17	(B)	-7.6
Stock clerks and storekeepers.....	158	349	0.45	117	394	0.30	35.0	-11.4
Teachers aides, except school monitors.....	315	27	11.67	184	22	8.36	71.2	(B)
Telephone operators.....	293	19	15.42	379	13	29.15	-22.7	(B)
All other clerical and kindred workers.....	3,191	1,563	2.04	2,432	1,562	1.56	31.2	0.1

See footnotes at end of table.

Table 3-1. Occupation of Employed Persons, by Sex: Annual Averages for 1978 and 1972—Continued

(Numbers in thousands. Civilian noninstitutional population 16 years and over. For meaning of symbols, see text)

Occupation	1978			1972			Percent change, 1972-1978 ¹	
	Women	Men	Ratio: women/men	Women	Men	Ratio: women/men	Women	Men
BLUE-COLLAR WORKERS								
Total.....	5,767	25,765	0.22	4,767	23,800	0.20	21.0	8.3
Craft and kindred workers.....	697	11,689	0.06	386	10,424	0.04	80.6	12.1
Construction craft workers.....	50	3,712	0.01	19	3,274	0.01	(B)	13.4
Blue-collar worker supervisors, n.e.c. ²	166	1,505	0.11	98	1,314	0.07	69.4	14.5
Machinists and job setters.....	18	573	0.03	3	467	0.01	(B)	22.7
Metal craft workers, except mechanics, machinists, and job setters.....	17	605	0.03	12	613	0.02	(B)	-1.3
Mechanics and repairers.....	49	3,285	0.01	22	2,746	0.08	(B)	19.6
Printing craft workers.....	91	325	0.28	59	337	0.18	(B)	-3.6
Decorators and window dressers.....	88	37	2.38	53	35	1.51	(B)	(B)
All other craft and kindred workers.....	218	1,647	0.13	120	1,638	0.07	81.7	0.5
Operatives, except transport.....	4,321	6,554	0.66	3,980	6,351	0.63	8.6	3.2
Assemblers.....	607	557	1.09	476	542	0.88	27.5	2.8
Checkers, examiners, and inspectors, manufacturing.....	359	377	0.95	332	353	0.94	8.1	6.8
Garage workers and gas station attendants.....	20	395	0.05	23	479	0.05	(B)	-17.5
Packers and wrappers, except meat and produce....	422	253	1.67	395	253	1.56	6.8	-
Precision machine operatives.....	43	342	0.13	39	350	0.11	(B)	-2.3
Sewers and stitchers.....	772	43	17.95	897	39	23.00	-13.9	(B)
Textile operatives.....	224	150	1.49	234	190	1.23	-4.3	-21.1
Welders and flame cutters.....	41	637	0.06	20	534	0.04	(B)	19.3
All other operatives, except transport.....	1,833	3,800	0.48	1,564	3,611	0.43	17.2	5.2
Transport equipment operatives.....	258	3,284	0.08	134	3,075	0.04	92.5	6.8
Busdrivers.....	152	186	0.82	86	166	0.52	76.7	12.0
Delivery and route workers.....	38	541	0.07	22	870	0.03	(B)	-37.8
Fork lift and tow motor operatives.....	10	353	0.03	3	300	0.01	(B)	17.7
Truckdrivers.....	37	1,886	0.02	8	1,433	0.01	(B)	31.6
All other transport equipment operatives.....	21	938	0.02	15	306	0.05	(B)	206.5
Laborers, except farm.....	491	4,238	0.12	267	3,950	0.07	83.9	7.3
Construction laborers.....	26	927	0.03	5	937	0.01	(B)	-1.1
Freight and material handlers.....	68	729	0.09	45	715	0.06	(B)	2.0
Gardeners and groundskeepers, except farm.....	36	578	0.06	12	532	0.02	(B)	8.6
Stockhandlers.....	215	700	0.31	122	601	0.20	76.2	16.5
All other laborers, except farm.....	146	1,304	0.11	83	1,165	0.07	75.9	11.9
FARM WORKERS								
Total.....	508	2,289	0.22	543	2,526	0.21	-6.4	-9.4
Farmers and farm managers.....	131	1,349	0.10	100	1,588	0.06	31.0	-15.1
Farm laborers and supervisors.....	377	940	0.40	443	938	0.47	-14.9	0.2
SERVICE WORKERS								
Total.....	8,035	4,804	1.67	6,838	4,128	1.66	17.5	16.4
Service workers, except private household.....	6,900	4,777	1.44	5,435	4,094	1.33	27.0	16.7
Cleaning service workers.....	858	1,572	0.55	680	1,393	0.49	26.2	12.9
Food service workers.....	2,949	1,334	2.21	2,277	986	2.31	29.5	35.3
Health service workers.....	1,659	187	8.87	1,310	196	6.68	26.6	-4.6
Personal service workers.....	1,318	441	2.99	1,102	440	2.50	19.6	0.2
Protective service workers.....	115	1,242	0.09	65	1,079	0.06	(B)	15.1
Private household workers.....	1,135	27	42.04	1,403	34	41.26	-19.1	(B)

¹Percent change between absolute numbers.²Not elsewhere classified.Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 26, No. 1; and Vol. 19, No. 7; and U.S. Department of Commerce, Bureau of the Census, unpublished Current Population Survey data.

Table 8-2. Years of School Completed by Employed Persons 25 to 64 Years Old, by Major Occupation Group and Sex: 1978

(Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks)

Major occupation group	Elementary: 0 to 8 years		High school: 1 to 3 years		High school: 4 years		College: 1 to 3 years		College: 4 or more years	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Total employed.....	2,319	4,937	3,629	5,117	12,553	14,675	4,512	7,035	4,838	9,699
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White-collar workers.....	15.3	10.3	31.4	18.4	66.3	33.1	83.0	57.5	94.6	90.9
Professional, technical, and kindred workers.....	1.2	1.0	1.6	1.9	6.6	5.8	21.3	16.4	66.0	52.6
Managers and administrators, except farm.....	3.1	5.5	5.2	9.9	7.4	14.9	9.3	22.6	9.1	25.3
Sales workers.....	3.3	1.4	6.0	2.6	7.0	5.1	7.4	10.1	4.4	8.6
Clerical and kindred workers.....	7.7	2.3	18.5	3.9	45.3	7.4	44.8	8.5	15.0	4.5
Blue-collar workers.....	42.0	69.9	34.2	68.6	14.3	55.3	5.1	32.7	1.8	6.1
Craft and kindred workers.....	2.7	26.7	3.4	30.2	2.0	29.8	1.5	20.0	0.6	3.9
Operatives, including transport.....	37.0	30.9	28.7	29.3	11.3	20.3	3.3	9.2	1.0	1.6
Laborers, except farm.....	2.3	12.4	2.1	9.2	0.9	5.2	0.3	3.5	0.2	0.6
Farm workers.....	2.1	8.8	1.1	3.7	1.1	3.7	0.8	1.7	0.5	1.1
Service workers.....	40.5	11.0	33.4	9.4	18.2	7.9	11.1	8.1	3.2	1.9

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 8-3. Major Occupation Group of Employed Married Women With Husband Present, by Employment Status and Major Occupation Group of Husband: 1978

(Numbers in thousands. Noninstitutional population 16 years and over excluding members of the Armed Forces living in barracks)

Employment status and major occupation group of husband	Total employed wives	Percent	Major occupation group of wife				
			White-collar workers				
			Total	Professional, technical, and kindred workers	Managers and admin- istrators, except farm	Sales workers	Clerical and kindred workers
Total husbands.....	21,616	100.0	65.8	17.0	6.9	7.0	34.9
Employed husbands.....	18,914	100.0	67.5	17.7	7.0	7.0	35.8
White-collar workers.....	8,875	100.0	<u>82.6</u>	27.0	9.2	8.3	38.1
Professional, technical, and kindred workers.....	3,177	100.0	86.7	<u>40.5</u>	7.6	6.7	32.0
Managers and administrators, except farm.....	3,296	100.0	81.6	20.3	<u>12.2</u>	8.5	40.6
Sales workers.....	1,225	100.0	83.8	19.4	<u>10.0</u>	<u>13.0</u>	41.4
Clerical and kindred workers.....	1,177	100.0	73.2	17.5	4.4	<u>7.0</u>	<u>44.4</u>
Blue-collar workers.....	8,274	100.0	54.8	8.8	4.8	6.0	35.3
Craft and kindred workers.....	4,196	100.0	60.7	10.0	5.5	6.6	38.6
Operatives, including transport.....	3,149	100.0	49.2	7.5	4.4	5.2	32.1
Laborers, except farm.....	929	100.0	47.4	7.6	3.3	5.6	30.8
Farm workers.....	569	100.0	42.7	13.5	3.2	3.7	22.3
Service workers.....	1,198	100.0	54.3	12.3	6.6	6.7	28.7
Employment status and major occupation group of husband	Major occupation group of wife--Continued						
	Blue-collar workers					Farm workers	Service workers
	Total	Craft and kindred workers	Operatives, including transport	Laborers, except farm			
Total husbands.....	15.2	1.8	12.6	0.9	1.3	17.6	
Employed husbands.....	14.6	1.7	12.0	0.9	1.4	16.4	
White-collar workers.....	6.4	1.3	4.7	0.5	0.5	10.4	
Professional, technical, and kindred workers.....	3.6	0.7	2.6	0.3	0.8	8.9	
Managers and administrators, except farm.....	7.4	1.8	4.9	0.8	0.4	10.6	
Sales workers.....	6.0	1.3	4.5	0.2	0.1	10.0	
Clerical and kindred workers.....	12.0	1.9	9.9	0.3	0.3	14.4	
Blue-collar workers.....	<u>23.8</u>	2.3	20.0	1.5	0.6	20.7	
Craft and kindred workers.....	<u>20.8</u>	<u>2.6</u>	16.9	1.2	0.6	17.9	
Operatives, including transport.....	28.4	<u>2.1</u>	<u>24.7</u>	1.6	0.6	21.8	
Laborers, except farm.....	22.5	1.7	<u>18.3</u>	<u>2.5</u>	0.8	29.4	
Farm workers.....	9.0	0.9	7.9	0.2	<u>30.4</u>	17.9	
Service workers.....	14.2	1.2	12.6	0.4	0.4	<u>31.1</u>	

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 8-4. Industry of Employed Persons, by Sex: Annual Averages for 1978 and 1972

(Numbers in thousands. Civilian noninstitutional population 16 years and over. For meaning of symbols, see text)

Industry	1978			1972			Percent change, 1972-78 ¹	
	Women	Men	Ratio: women/men	Women	Men	Ratio: women/men	Women	Men
Total employed.....	38,882	55,491	0.70	31,072	50,630	0.61	25.1	9.6
Agriculture, forestry, and fisheries.....	686	2,815	0.24	644	2,941	0.22	6.5	-4.3
Mining.....	97	731	0.13	41	556	0.07	(B)	31.5
Construction.....	413	5,630	0.07	291	4,955	0.06	41.9	13.6
Manufacturing.....	6,554	14,943	0.44	5,570	14,296	0.39	17.7	4.5
Durable goods.....	3,101	9,720	0.32	2,340	9,228	0.25	32.5	5.3
Transportation equipment.....	337	1,893	0.18	237	1,788	0.13	42.2	5.9
Other durable goods.....	2,762	7,826	0.35	2,103	7,440	0.28	31.3	5.2
Nondurable goods.....	3,453	5,223	0.66	3,230	5,068	0.64	6.9	3.1
Transportation, communications, and other public utilities.....	1,441	4,722	0.31	1,126	4,336	0.26	28.0	8.9
Transportation.....	662	2,886	0.23	447	2,673	0.17	48.1	8.0
Communications, and utilities and sanitary services.....	778	1,835	0.42	679	1,663	0.41	14.6	10.3
Wholesale and retail trade.....	8,764	10,489	0.84	6,911	9,558	0.72	26.8	9.7
Wholesale trade.....	899	2,717	0.33	667	2,393	0.28	34.8	13.5
Retail trade.....	7,865	7,772	1.01	6,245	7,165	0.87	25.9	8.5
Finance, insurance, and real estate.....	3,004	2,403	1.25	2,155	2,172	0.99	39.4	10.6
Banking and other finance.....	1,407	745	1.89	1,008	758	1.33	39.6	-1.7
Insurance and real estate.....	1,596	1,657	0.96	1,147	1,414	0.81	39.1	17.2
Business and repair services.....	1,071	2,420	0.44	708	1,803	0.39	51.3	34.2
Business services.....	906	1,222	0.74	594	862	0.69	52.5	41.8
Repair services.....	165	1,198	0.14	115	941	0.12	43.5	27.3
Personal services.....	2,845	981	2.90	3,010	1,049	2.87	-5.5	-6.5
Entertainment and recreation services.....	380	638	0.60	259	465	0.56	46.7	37.2
Professional and related services.....	11,938	6,389	1.87	9,050	5,404	1.67	31.9	18.2
Health services.....	5,046	1,666	3.03	3,685	1,359	2.71	36.9	22.6
Education services.....	4,960	2,664	1.86	4,152	2,478	1.68	19.5	7.5
Other professional services.....	1,931	2,058	0.94	1,213	1,567	0.77	59.2	31.3
Public administration.....	1,689	3,331	0.51	1,306	3,093	0.42	29.3	7.7

¹Percent change between absolute numbers.Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 26, No. 1; Vol. 19, No. 7; and U.S. Department of Commerce, Bureau of the Census, unpublished Current Population Survey data.**Table 8-5. Number and Receipts of Women-Owned Firms Compared With All U.S. Firms, by Industry: 1972**

(Excludes corporations with more than 10 shareholders, except those that are "closely held." For meaning of symbols, see text)

Industry ¹	All U.S. firms ² (thousands)	Women-owned firms		All receipts ² (billions)	Receipts of women-owned firms	
		Total (thousands)	Percent of all firms		Total (billions)	Percent of all receipts
Total, all industries.....	8,730	402	4.6	\$2,381.2	\$8.1	0.3
Construction.....	1,020	15	1.5	146.2	0.5	0.3
Manufacturing.....	437	8	1.8	875.3	0.3	-
Transportation and public utilities.....	³ 432	7	1.6	³ 159.5	0.1	0.1
Wholesale trade.....	560	5	0.9	349.4	0.6	0.2
Retail trade.....	2,381	133	5.6	474.9	4.2	0.9
Finance, insurance, and real estate.....	⁴ 1,318	37	2.8	⁴ 252.8	0.5	0.2
Selected services.....	⁴ 2,212	151	6.8	⁴ 95.5	1.5	1.6
Other industries and industries not classified.	⁴ 370	45	12.2	⁴ 27.6	0.4	1.4

¹Based on 1972 Standard Industrial Classification (SIC) system. Not strictly comparable with industry classifications shown in table 8-4. For more information, see source cited below.²Based on data from U.S. Internal Revenue Service, Preliminary Report, Statistics of Income, Business Income Tax Returns, 1972.³Excludes railroads.⁴Adjusted to exclude selected SIC industries. For more information, see "Introduction" in source cited below.Source: U.S. Department of Commerce, Bureau of the Census, Women-Owned Businesses, 1972.

Chapter 9

Income and Poverty Status



Income and earnings of persons. Although women have made gains toward equality with men in several areas, differences between the incomes of women and men remain substantial. Part of the income differential is attributable to differences in such factors as annual work experience, educational attainment, occupational distribution, industry of employment, and extent of lifetime work experience. However, discrimination in hiring, promotions, hours of work, and pay cannot be ruled out as contributing to the differential.

It is desirable, in principle, to control for differences in important social and economic characteristics, such as those mentioned above, before comparing the earnings levels of women and men. Most of the tables in this chapter show earnings data for women and men who were year-round, full-time workers, which thereby standardizes annual work experience for the year in which earnings were received. It is important to recognize, however, that there may be other factors which have not been controlled that could be related to differences in earnings levels.

In 1977, the median earnings for women who were year-round, full-time workers (\$8,620) was only about 59 percent of the median for men with a comparable amount of work experience (\$14,630) (table 9-1). The number of female earners working year round full time increased relative to men from a ratio of 43 per 100 men in 1970 to 49 per 100 men in 1977. Nevertheless, during the 1970-77 period, the earnings ratio of women to men for year-round, full-time workers did not vary significantly.

The difference between the income levels of men and women is smaller among young adults than among older persons. The 1977 median income of women 20 to 24 years old working year round full time, for example, was about three-fourths of the median of comparable men (table 9-2). Year-round, full-time female workers 25 to 34 years old, however, had a 1977 median income of about 68 percent of that of comparable men, and the median income of such women 35 years old and over was about 55 percent of the median of their male counterparts.

Women working year round full time were less likely to be college graduates than were comparable men (18 percent versus 25 percent, respectively) (table 9-3 and figure 9-1).

Female college graduates had a 1977 median income (\$12,660) that was nearly two-thirds of that of their male counterparts (\$20,630). In fact, such women had incomes that were, on average, lower than the incomes of men with only a high school education (\$15,430 in 1977). However, earnings levels are dependent not only on work experience and education but also on a combination of these and other factors.

Currently, as in the past, women tend to be concentrated in different occupational categories from men (table 9-4). For example, women working year round full time are much more concentrated than comparable men in lower paying occupational groups, such as clerical and service workers. As shown in chapter 8 (table 8-2), a high proportion of female workers with 1 to 3 years of college education were in these occupational groups, although the percentage was smaller for college graduates.

This fact helps to explain the disparity between the median incomes of women and men with similar amounts of education. Although the ratios of women to men employed in clerical and service occupations increased between 1970 and 1977, the ratios also increased for professional workers and for managers, which are higher paying occupation groups. The median earnings for female professional workers were \$12,000 in 1977, or about two-thirds that of male professional workers (\$18,220). Although the highest percentage of female college graduates were in this occupational group, they tended to be more concentrated than men in the traditionally lower paying professions, such as teaching and health-related fields (e.g., nurses). The broad occupational categories shown in table 9-4 obscure some of the other differences in earnings levels for the specific occupations within these groups.

The above comparisons have been restricted to persons who worked at full-time jobs for the entire year (50 to 52 weeks). However, approximately one-third of the women and about one-seventh of the men with earnings in 1977 worked at part-time jobs (table 9-5). The median earnings for women working at part-time jobs were approximately equal to those of their male counterparts. Women who worked 50 to 52 weeks part time actually had higher median earnings than did men with the same amount of work experience (female-to-male earnings ratio of 1.12). In contrast, the female-to-male earnings ratio of full-time workers ranged from .59 for those working 50 to 52 weeks to .70 for those working fewer than 26 weeks. Thus, the returns for working full time do not seem to be as great for women as for men.

As with men, many women receive income from more than one source, but the mean amounts of each type of income vary greatly (table 9-6). For example, for wage and salary income (the type of income received by the greatest number of persons), women received an average of about \$5,550 in 1977, while men received an average of approximately \$12,000.

The only types of income for which the means for women and men approached equality were property income (e.g., interest, dividends, and rent) and Supplemental Security income. Although property income was second largest in terms of the numbers of persons receiving it, both property income and Supplemental Security income had mean amounts that were quite low. The reason for the near equality of mean income from Supplemental Security income for women and men is quite evident: Supplemental Security income, a governmental transfer payment designed to provide the recipient with minimal subsistence, is administered without regard to sex.

For the elderly (persons 65 years and over), the female-to-male income ratios by type of income followed basically the same pattern as for all age groups combined. As expected, the proportion of both women and men receiving wages or salaries within this age group was significantly smaller than that among younger persons, whereas the proportion receiving the various types of retirement income was larger.

A critical factor in assessing differences between the earnings of women and men is the extent of lifetime work experience. Recent data on this topic are not available, but data from a longitudinal study of women 30 to 44 years old in 1967¹ provide some insight into the effects of differences in lifetime work experience. For example, year-round, full-time female workers who had worked at least 6 months of every year since leaving school had a median wage or salary income in 1967 of about three-fourths that of men. The median wage or salary income for comparable women who had worked in only one-half of the years since leaving school was only about one-half that of men.

Although discontinuities in work experience explain some of the differences in the wages earned by women and men, research has shown that even after adjusting for such differences, much remains to be explained. For example, a study based on this same 1967 longitudinal survey indicated that even after adjusting for differences in occupational status, education, and lifetime work experience, the wages and salaries of women were estimated to be only about three-fifths as high as those of men.² Also, results from a study based on Census Bureau and Social Security Administration records corroborate the finding that women do not receive the same returns from continuous work experience as do men.³ Obviously, there are variables that

¹ 1967 National Longitudinal Survey of Work Experience, conducted by the Bureau of the Census, under contract with the Employment and Training Administration (then Manpower Administration), U.S. Department of Labor.

² Larry E. Suter and Herman P. Miller, "Income Differences Between Men and Career Women," *The American Journal of Sociology*, Vol. 78, No. 4, January 1973.

³ Joyce A. Stevens and Roger A. Herriot, "Current Earnings Differentials of Men and Women: Some Explanatory Regression Analyses," paper presented at the August 1975 meetings of the American Statistical Association.

were not covered in these studies that may account for the residual differences between the income levels of women and men.

Family income. Between 1970 and 1977, the contribution of the wife's earnings to total family income of married-couple families remained fairly stable at approximately one-fourth (table 9-7). The wife's contribution was slightly higher for those families in which the husband was under 25 years of age than it was for families with older husbands.

The contribution of the wife to total family income is related to the amount of time she works during the year. The relationship during the 1970-77 period was as follows: the median contribution of wives who worked year round full time was approximately 39 percent; for wives working 27 to 49 weeks full time, the contribution was about 30 percent; and for those working either 1 to 26 weeks full time or 1 to 52 weeks part time, it was about 12 percent. Furthermore, as shown in table 9-8, the median income in 1977 of married-couple families with the wife in the paid labor force was about 35 percent higher than the median income of those families in which the wife was not in the paid labor force.

The median income of families with a female householder, no husband present, was much lower than that of married-couple families or families with a male householder, no wife present (table 9-8). This disparity arises partly because married-couple families often have more than one earner contributing to family income, and also because, in general, men have higher incomes than women. In 1970, the median income ratio of families with a female householder (no husband present) to families with a male householder (no wife present) was 57 percent; the 1977 ratio showed no significant change from its 1970 level.

Poverty status. Of the 24.7 million persons below the poverty level in 1977, approximately 14.4 million were females (table 9-9). From 1970 to 1977, the poverty rate for women declined slightly (from 14 to 13 percent); men also experienced a slight decrease (from 11 to 10 percent). During this same period, the ratio of females to males among the poor remained fairly constant.

The poverty rate for the elderly (65 years and over) showed the largest change among both women and men

between 1970 and 1977. More specifically, there was a significant decrease in the poverty rate for elderly women from 28 percent in 1970 to 17 percent in 1977—a decrease of approximately two-fifths. The comparable decline for men was from 19 percent to 10 percent. This decrease in poverty is attributable to enactment of substantial increases in Social Security benefits since 1970.

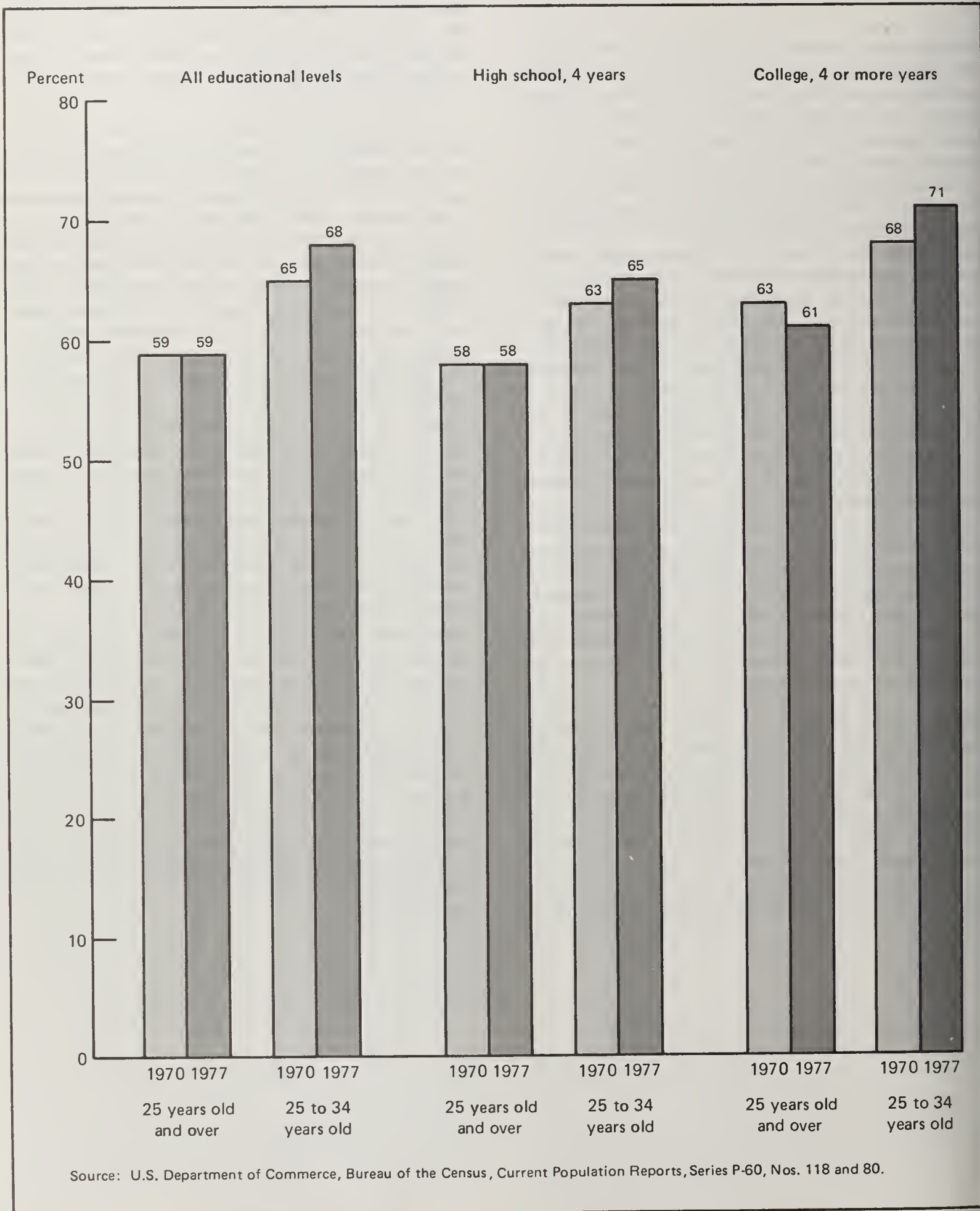
In 1977, families with a female householder, no husband present, had about the same poverty rate as in 1970; however, there was a 35-percent increase in the number of such poor families during this period because of a substantial increase in the number of families with a female householder in the general population (table 9-10). Meanwhile, other families (that is, married-couple families and families with a male householder, no wife present) experienced a decline both in the number of poor and in the poverty rate. In 1970, there were about 59 families with a female householder, no husband present, who were below the poverty level for every 100 other poor families. The comparable ratios were 80 in 1975 and 97 in 1977.

Most of the increase between 1970 and 1977 in the number of poor families with female householders occurred among families with children. There were 93 poor female-householder families with children under 18 years for every 100 other poor families with children under 18 years in 1970; this ratio reached 140 per 100 by 1977. In contrast, there was only a slight increase in the ratio of poor female-householder families without children to other families without children (from 18 to 22 per 100).

As might be expected from these figures, the majority of children in families below the poverty level in 1977 were in families with a female householder, no husband present, while in 1970, the majority were in other poor families (table 9-11). In 1977, there were 129 children in poor female-householder families for every 100 in other poor families, in contrast with a ratio of 85 to 100 in 1970. In general, persons in families below the poverty level in 1977 were more likely to be in families with a female householder, no husband present, than they were in 1970. Among poor unrelated individuals, however, the ratio of females to males declined during this period, from 254 per 100 in 1970 to 190 per 100 in 1977.

FIGURE 9-1.

Female/Male Median Income Ratio for Year-Round, Full-Time Workers 25 Years Old and Over and 25 to 34 Years Old, by Years of School Completed: 1970 and 1977



**Table 9-1. Number and Median Earnings of Year-Round, Full-Time Civilian Workers With Earnings, by Sex:
1967 to 1977**

(In 1977 dollars. Numbers in thousands. Persons as of the following year. Civilian noninstitutional population 14 years and over)

Year	Number with earnings			Median earnings		
	Women	Men	Ratio: women/ men	Women	Men	Ratio: women/ men
1977.....	19,238	39,263	0.49	\$8,618	\$14,626	0.59
1976.....	18,073	38,184	0.47	8,622	14,323	0.60
1975.....	17,452	37,267	0.47	8,449	14,175	0.60
1974 ^r	16,945	37,916	0.45	8,565	14,578	0.59
1974.....	17,977	38,898	0.46	8,322	14,543	0.57
1973.....	17,195	39,581	0.43	8,639	15,254	0.57
1972.....	16,675	38,184	0.44	8,551	14,778	0.58
1971.....	16,022	36,819	0.44	8,369	14,064	0.60
1970.....	15,476	36,132	0.43	8,307	13,993	0.59
1969.....	15,374	37,008	0.42	8,227	13,976	0.59
1968.....	15,013	37,068	0.41	7,763	13,349	0.58
1967.....	14,791	36,631	0.40	7,503	13,021	0.58

^rRevised.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, nos. 118, 114, 104, 103, 101, 93, 90, 85, 80, 75, 66, and 60.

Table 9-2. Median Income of Year-Round, Full-Time Civilian Workers With Income, by Age and Sex: 1977, 1975, and 1970

(In 1977 dollars. Numbers in thousands. Persons as of the following year. Civilian noninstitutional population 14 years and over)

Sex and age	1977		1975		1970	
	Number with income	Median income	Number with income	Median income	Number with income	Median income
WOMEN						
Total with income.....	19,278	\$ 8,814	17,479	\$ 8,691	15,518	\$ 8,490
14 to 19 years.....	419	5,632	431	5,143	335	5,904
20 to 24 years.....	2,760	7,497	2,496	7,429	2,224	7,691
25 to 34 years.....	5,365	9,543	4,579	9,459	2,899	9,244
35 to 44 years.....	3,904	9,282	3,336	9,102	3,081	8,632
45 to 54 years.....	3,836	9,142	3,711	8,985	3,865	8,721
55 to 64 years.....	2,684	8,846	2,585	8,765	2,690	8,533
65 years and over.....	309	7,838	341	8,189	423	7,622
MEN						
Total with income.....	39,287	\$15,070	37,278	\$14,563	36,146	\$14,333
14 to 19 years.....	584	6,042	572	6,369	419	6,164
20 to 24 years.....	3,622	9,800	3,303	9,594	2,700	10,386
25 to 34 years.....	11,267	14,129	10,256	14,170	8,763	14,242
35 to 44 years.....	8,899	16,863	8,382	16,497	8,649	16,009
45 to 54 years.....	8,425	17,029	8,331	16,609	8,756	15,499
55 to 64 years.....	5,733	15,669	5,518	14,981	5,757	14,156
65 years and over.....	758	13,815	918	12,843	1,102	10,540
RATIO: WOMEN/MEN						
Total with income.....	0.49	0.58	0.47	0.60	0.43	0.59
14 to 19 years.....	0.72	0.93	0.75	0.81	0.80	0.96
20 to 24 years.....	0.76	0.76	0.76	0.77	0.82	0.74
25 to 34 years.....	0.48	0.68	0.47	0.67	0.33	0.65
35 to 44 years.....	0.44	0.55	0.40	0.55	0.36	0.54
45 to 54 years.....	0.46	0.54	0.45	0.54	0.44	0.56
55 to 64 years.....	0.47	0.56	0.47	0.59	0.47	0.60
65 years and over.....	0.41	0.57	0.37	0.64	0.38	0.72

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, Nos. 118, 105, and 80.

Table 9-3. Number and Median Income of Year-Round, Full-Time Civilian Workers 25 Years Old and Over and 25 to 34 Years Old With Income, by Years of School Completed and Sex: 1977, 1975, and 1970

(In 1977 dollars. Numbers in thousands. Persons as of the following year. Civilian noninstitutional population. For meaning of symbols, see text)

Age, sex, and years of school completed	1977		1975		1970	
	Number with income	Median income	Number with income	Median income	Number with income	Median income
25 YEARS OLD AND OVER						
Women						
Total.....	16,099	\$9,257	14,552	\$9,139	12,959	\$8,764
Elementary: 0 to 7 years.....	577	6,074	519	5,752	733	5,927
8 years.....	671	6,564	644	6,408	959	6,525
High school: 1 to 3 years.....	1,918	7,387	1,807	7,155	1,979	7,265
4 years.....	7,342	8,894	6,599	8,756	5,790	8,708
College: 1 to 3 years.....	2,661	10,157	2,235	10,275	1,589	10,306
4 or more years.....	2,930	12,656	2,748	12,645	1,908	13,607
Men						
Total.....	35,081	\$15,726	33,404	\$15,309	33,028	\$14,859
Elementary: 0 to 7 years.....	1,971	9,419	1,979	9,736	2,777	9,431
8 years.....	1,915	12,083	2,092	11,817	3,220	11,759
High school: 1 to 3 years.....	4,108	13,120	4,132	12,849	5,114	13,287
4 years.....	12,462	15,434	12,070	14,956	11,736	14,930
College: 1 to 3 years.....	5,996	16,235	5,297	16,872	4,277	17,452
4 or more years.....	8,629	20,625	7,834	20,310	5,903	21,647
Ratio: Women/Men						
Total.....	0.46	0.59	0.44	0.60	0.39	0.59
Elementary: 0 to 7 years.....	0.29	0.64	0.26	0.59	0.26	0.63
8 years.....	0.35	0.54	0.31	0.54	0.30	0.55
High school: 1 to 3 years.....	0.47	0.56	0.44	0.56	0.39	0.55
4 years.....	0.59	0.58	0.55	0.59	0.49	0.58
College: 1 to 3 years.....	0.44	0.63	0.42	0.61	0.37	0.59
4 or more years.....	0.34	0.61	0.35	0.62	0.32	0.63
25 TO 34 YEARS OLD						
Women						
Total.....	5,365	\$9,543	4,579	\$9,459	2,899	\$9,244
Elementary: 0 to 7 years.....	64	(B)	48	(B)	55	(B)
8 years.....	75	5,805	47	(B)	69	(B)
High school: 1 to 3 years.....	378	7,399	336	6,918	327	6,890
4 years.....	2,250	8,767	1,987	8,653	1,375	8,714
College: 1 to 3 years.....	1,173	9,904	865	9,727	438	9,763
4 or more years.....	1,426	11,318	1,297	11,642	635	12,666
Men						
Total.....	11,267	\$14,129	10,256	\$14,170	8,763	\$14,242
Elementary: 0 to 7 years.....	255	8,501	229	8,403	311	8,562
8 years.....	202	10,155	186	9,780	346	10,309
High school: 1 to 3 years.....	912	11,018	842	11,464	1,097	11,915
4 years.....	3,951	13,484	3,807	13,620	3,751	13,760
College: 1 to 3 years.....	2,589	14,399	2,132	14,810	1,441	15,481
4 or more years.....	3,358	16,041	3,060	16,381	1,817	18,551
Ratio: Women/Men						
Total.....	0.48	0.68	0.45	0.67	0.33	0.65
Elementary: 0 to 7 years.....	0.25	(X)	0.21	(X)	0.18	(X)
8 years.....	0.37	0.57	0.25	(X)	0.20	(X)
High school: 1 to 3 years.....	0.41	0.67	0.40	0.60	0.30	0.58
4 years.....	0.57	0.65	0.52	0.64	0.37	0.63
College: 1 to 3 years.....	0.45	0.69	0.41	0.66	0.30	0.63
4 or more years.....	0.42	0.71	0.42	0.71	0.35	0.68

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, Nos. 118, 105, and 80.

Table 9-4. Number and Median Earnings of Year-Round, Full-Time Civilian Workers With Earnings, by Occupation of Longest Job and Sex: 1977, 1975, and 1970

(In 1977 dollars. Numbers in thousands. Persons as of the following year. Civilian noninstitutional population 14 years and over. For meaning of symbols, see text)

Sex and occupation of longest job	1977		1975		1970	
	Number with earnings	Median earnings	Number with earnings	Median earnings	Number with earnings	Median earnings
WOMEN						
Total.....	19,238	\$8,618	17,452	\$8,449	15,476	\$8,307
Professional, technical, and kindred workers...	3,627	11,995	3,316	11,829	2,834	12,251
Salaried.....	3,561	12,026	3,267	11,848	2,789	12,260
Self-employed.....	67	(B)	49	(B)	45	(B)
Managers and administrators, except farm.....	1,660	9,799	1,397	10,274	1,066	9,940
Salaried.....	1,441	10,272	1,227	10,612	849	10,745
Self-employed.....	218	4,258	170	6,854	217	5,635
Sales workers.....	782	6,825	751	6,148	650	6,514
Clerical and kindred workers.....	7,561	8,601	7,065	8,514	6,013	8,644
Craft and kindred workers.....	365	8,902	258	8,183	219	7,733
Operatives, including transport.....	2,441	7,350	1,979	7,038	2,184	6,968
Laborers, except farm.....	170	7,441	158	7,811	117	6,828
Service workers, except private household.....	2,363	6,330	2,261	6,096	1,997	6,047
Private household workers.....	172	2,714	193	2,717	314	3,106
Farmers and farm managers.....	46	(B)	36	(B)	49	(B)
Farm laborers and supervisors.....	52	(B)	38	(B)	32	(B)
MEN						
Total.....	39,263	\$14,626	37,267	\$14,175	36,132	\$13,993
Professional, technical, and kindred workers...	6,626	18,224	6,415	17,785	5,725	19,125
Salaried.....	6,023	17,810	5,857	17,467	5,162	18,629
Self-employed.....	603	26,946	558	27,816	563	31,261
Managers and administrators, except farm.....	6,950	18,086	6,477	17,775	6,335	18,205
Salaried.....	5,828	19,023	5,379	18,437	4,895	19,659
Self-employed.....	1,122	12,428	1,097	12,601	1,439	12,121
Sales workers.....	2,321	16,067	2,297	15,583	2,071	15,239
Clerical and kindred workers.....	2,428	13,966	2,453	13,619	2,453	13,502
Craft and kindred workers.....	8,335	14,517	7,780	14,173	7,254	14,440
Operatives, including transport.....	6,411	12,612	5,827	12,392	6,180	11,929
Laborers, except farm.....	1,972	10,824	1,812	10,198	1,852	10,085
Service workers, except private household.....	2,737	10,338	2,636	10,683	2,546	10,868
Private household workers.....	3	(B)	-	(B)	12	(B)
Farmers and farm managers.....	1,063	5,601	1,128	7,465	1,326	6,057
Farm laborers and supervisors.....	419	7,278	442	5,958	378	5,236
RATIO: WOMEN/MEN						
Total.....	0.49	0.59	0.47	0.60	0.43	0.59
Professional, technical, and kindred workers...	0.55	0.66	0.52	0.67	0.50	0.64
Salaried.....	0.59	0.68	0.56	0.68	0.54	0.66
Self-employed.....	0.11	(X)	0.09	(X)	0.08	(X)
Managers and administrators, except farm.....	0.24	0.54	0.22	0.58	0.17	0.55
Salaried.....	0.25	0.54	0.23	0.58	0.17	0.55
Self-employed.....	0.19	0.34	0.15	0.54	0.15	0.46
Sales workers.....	0.34	0.42	0.33	0.39	0.31	0.43
Clerical and kindred workers.....	3.11	0.62	2.88	0.63	2.45	0.64
Craft and kindred workers.....	0.04	0.61	0.03	0.58	0.03	0.54
Operatives, including transport.....	0.38	0.58	0.34	0.57	0.35	0.58
Laborers, except farm.....	0.09	0.69	0.09	0.77	0.06	0.68
Service workers, except private household.....	0.86	0.61	0.86	0.57	0.78	0.56
Private household workers.....	(B)	(X)	(B)	(X)	(B)	(X)
Farmers and farm managers.....	0.04	(X)	0.03	(X)	0.04	(X)
Farm laborers and supervisors.....	0.12	(X)	0.09	(X)	0.08	(X)

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, Nos. 118, 105, and 80.

Table 9-5. Number and Median Earnings of Civilian Workers With Earnings, by Work Experience and Sex: 1977, 1975, and 1970

(In 1977 dollars. Numbers in thousands. Persons as of the following year. Civilian noninstitutional population 14 years and over)

Sex and work experience	1977		1975		1970	
	Number with earnings	Median earnings	Number with earnings	Median earnings	Number with earnings	Median earnings
WOMEN						
Worked.....	46,194	\$ 4,674	42,926	\$ 4,451	38,273	\$ 4,260
Worked at full-time jobs.....	30,734	6,828	28,458	6,590	25,926	6,399
50 to 52 weeks.....	19,238	8,618	17,452	8,449	15,476	8,307
48 and 49 weeks.....	931	6,481	842	6,338	2,525	5,977
40 to 47 weeks.....	2,159	6,046	1,876	5,871		
27 to 39 weeks.....	2,656	4,290	2,471	4,247		
14 to 26 weeks.....	2,949	2,412	2,925	2,432	2,396	4,259
13 weeks or less.....	2,800	823	2,890	831	2,761	2,595
Worked at part-time jobs.....	15,461	1,437	14,468	1,434	2,767	768
50 to 52 weeks.....	4,881	3,149	4,914	3,151	12,347	1,144
40 to 49 weeks.....	1,856	2,628	1,645	2,550	3,463	2,714
27 to 39 weeks.....	2,032	1,925	1,977	1,753	1,365	2,325
14 to 26 weeks.....	2,940	946	2,520	914	1,563	1,785
13 weeks or less.....	3,752	557	3,411	606	2,464	939
					3,491	464
MEN						
Worked.....	61,704	\$11,037	59,268	\$10,892	55,821	\$11,162
Worked at full-time jobs.....	53,219	12,465	51,169	12,176	48,045	12,357
50 to 52 weeks.....	39,263	14,626	37,267	14,175	36,132	13,993
48 and 49 weeks.....	1,589	10,931	1,365	10,668	4,308	10,476
40 to 47 weeks.....	3,144	9,602	2,964	9,744		
27 to 39 weeks.....	3,356	6,662	3,470	7,027		
14 to 26 weeks.....	3,045	3,439	3,234	3,630	2,841	7,694
13 weeks or less.....	2,822	1,176	2,870	1,126	2,352	4,084
Worked at part-time jobs.....	8,485	1,404	8,099	1,356	2,411	1,195
50 to 52 weeks.....	2,655	2,813	2,714	2,760	7,776	1,345
40 to 49 weeks.....	951	2,962	823	2,725	2,604	2,567
27 to 39 weeks.....	969	2,158	982	1,890	714	2,392
14 to 26 weeks.....	1,642	1,042	1,504	1,004	852	2,018
13 weeks or less.....	2,268	571	2,076	628	1,414	1,239
					2,193	506
RATIO: WOMEN/MEN						
Worked.....	0.75	0.42	0.72	0.41	0.69	0.38
Worked at full-time jobs.....	0.58	0.55	0.56	0.54	0.54	0.52
50 to 52 weeks.....	0.49	0.59	0.47	0.60	0.43	0.59
48 and 49 weeks.....	0.59	0.59	0.62	0.59	0.59	0.57
40 to 47 weeks.....	0.69	0.63	0.63	0.60		
27 to 39 weeks.....	0.79	0.64	0.71	0.60		
14 to 26 weeks.....	0.97	0.70	0.90	0.67	0.84	0.55
13 weeks or less.....	0.99	0.70	1.01	0.74	1.17	0.64
Worked at part-time jobs.....	1.82	1.02	1.79	1.06	1.15	0.64
50 to 52 weeks.....	1.84	1.12	1.81	1.14	1.59	0.85
40 to 49 weeks.....	1.95	0.89	2.00	0.94	1.33	1.06
27 to 39 weeks.....	2.10	0.89	2.01	0.93	1.91	0.97
14 to 26 weeks.....	1.79	0.91	1.68	0.91	1.83	0.88
13 weeks or less.....	1.65	0.98	1.64	0.96	1.74	0.76
					1.59	0.92

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, nos. 118, 105, and 80.

Table 9-6. Number and Mean Income of Persons 14 Years Old and Over and 65 Years Old and Over, by Type of Income and Sex: 1977

(Numbers in thousands. Persons as of 1978. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Age and type of income	Number with income			Mean income		
	Women	Men	Ratio: women/men	Women	Men	Ratio: women/men
14 YEARS AND OVER						
Total.....	65,407	74,015	0.88	\$5,291	\$12,063	0.44
Wage or salary income.....	44,462	57,449	0.77	5,553	11,995	0.46
Nonfarm self-employment income.....	2,526	6,941	0.36	3,020	10,185	0.30
Farm self-employment income.....	400	2,642	0.15	1,925	3,559	0.54
Property income.....	17,294	33,402	0.52	1,282	1,215	1.06
Social Security or Railroad Retirement income.....	15,830	11,886	1.33	2,286	3,089	0.74
Supplemental Security income.....	2,171	1,197	1.81	1,282	1,303	0.98
Public assistance or welfare income.....	3,434	798	4.30	2,300	1,573	1.46
Veterans', unemployment, and workmen's compensation income.....	3,546	8,238	0.43	1,227	1,659	0.74
Retirement income.....	3,185	5,641	0.56	2,964	4,662	0.64
Other income.....	3,753	1,705	2.20	2,117	2,100	1.01
65 YEARS AND OVER						
Total.....	12,322	9,145	1.35	\$4,234	\$ 8,035	0.53
Wage or salary income.....	1,379	1,763	0.78	3,330	7,395	0.45
Nonfarm self-employment income.....	209	544	0.38	2,511	6,924	0.36
Farm self-employment income.....	150	459	0.33	2,615	3,384	0.77
Property income.....	5,213	5,429	0.96	2,125	2,531	0.84
Social Security or Railroad Retirement income.....	11,347	8,297	1.37	2,366	3,209	0.74
Supplemental Security income.....	1,299	593	2.19	1,098	998	1.10
Public assistance or welfare income.....	199	59	(B)	1,055	(B)	(X)
Veterans', unemployment, and workmen's compensation income.....	569	699	0.81	1,301	1,988	0.65
Retirement income.....	2,135	3,158	0.68	2,795	3,879	0.72
Other income.....	230	137	1.68	1,690	3,317	0.51

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 9-7. Contribution of Wife's Earnings to Total Family Income for Married-Couple Families, by Selected Characteristics: 1977, 1975, and 1970

Persons as of the following year. Civilian noninstitutional population. Data include only those families in which the wife had paid work experience. For meaning of symbols, see text)

Characteristic	Median percent of family income accounted for by wife's earnings		
	1977	1975	1970
Total wives with work experience...	26.1	26.3	26.7
AGE OF HUSBAND			
Under 25 years.....	28.9	30.7	30.2
25 years and over.....	25.8	25.9	26.3
WORK EXPERIENCE OF WIFE			
Worked 50 to 52 weeks full time.....	38.2	38.8	38.6
Worked 27 to 49 weeks full time.....	29.8	30.7	29.7
Worked 1 to 26 weeks full time or 1 to 52 weeks part time.....	11.1	11.8	11.9
FAMILY INCOME			
Under \$3,000.....	31.9	26.0	(NA)
\$3,000 to 4,999.....	28.1	23.4	24.8
\$5,000 to 6,999.....	22.5	25.2	22.8
\$7,000 to 9,999.....	26.5	26.9	23.9
\$10,000 to 14,999.....	25.5	25.5	27.6
\$15,000 and over.....	26.2	26.6	27.9

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, Nos. 206 and 244; and U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 9-8. Median Income of Families, by Type of Family: 1977, 1975, and 1970

In 1977 dollars. Numbers in thousands. Families as of the following year. Noninstitutional population (excluding members of the Armed Forces living in barracks)

Type of family	1977		1975		1970	
	Number	Median income	Number	Median income	Number	Median income
DIAN FAMILY INCOME						
Male householder, no husband present...	8,236	\$7,765	7,482	\$7,706	5,950	\$7,948
Female householder, no wife present.....	1,594	14,518	1,444	14,631	1,258	14,064
Married-couple family.....	47,385	17,616	47,318	16,739	44,739	16,411
Wife in paid labor force.....	21,936	20,268	20,833	19,408	17,568	19,158
Wife not in paid labor force.....	25,449	15,063	26,486	14,358	27,172	14,520
RATIO OF MEDIAN FAMILY INCOME						
Male householder, no husband present/ Female householder, no wife present.....	5.17	0.53	5.18	0.53	4.73	0.57
Wife in paid labor force/ wife not in paid labor force.....	0.86	1.35	0.79	1.35	0.65	1.32

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, nos. 118, 105, and 80.

Table 9-9. Persons Below the Poverty Level, by Age and Sex: 1977, 1975, and 1970

(Numbers in thousands. Persons as of the following year. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Sex and age	Number below poverty level			Poverty rate			Change, 1970-77	
	1977	1975	1970	1977	1975	1970	Number	Rate
WOMEN								
All ages.....	14,381	14,970	¹ 14,632	13.0	13.8	14.0	-251	-1.0
Under 14 years.....	3,864	4,243	4,132	16.9	17.9	15.5	-268	1.4
14 to 21 years.....	2,414	2,534	¹ 1,959	14.7	15.4	13.1	455	1.6
22 to 34 years.....	2,533	2,384	1,904	11.2	11.1	10.5	629	0.7
35 to 44 years.....	1,161	1,248	1,090	9.5	10.7	9.4	71	0.1
45 to 54 years.....	1,005	1,029	1,043	8.4	8.5	8.6	-38	-0.2
55 to 59 years.....	605	581	628	10.4	10.5	12.0	-23	-1.6
60 to 64 years.....	582	648	719	11.8	13.2	15.9	-137	-4.1
65 years and over.....	2,216	2,303	3,157	16.7	18.1	28.5	-941	-11.8
MEN								
All ages.....	10,340	10,908	¹ 10,879	10.0	10.7	11.1	-539	-1.1
Under 14 years.....	3,992	4,335	4,398	16.8	17.6	15.9	-406	0.9
14 to 21 years.....	1,932	2,055	¹ 1,749	11.8	12.6	12.2	183	-0.4
22 to 34 years.....	1,392	1,333	1,110	6.4	6.5	6.4	282	-
35 to 44 years.....	694	712	698	6.0	6.4	6.3	-4	-0.3
45 to 54 years.....	666	679	611	6.0	6.0	5.5	55	0.5
55 to 59 years.....	338	373	332	6.5	7.4	7.0	6	-0.5
60 to 64 years.....	364	408	428	8.0	9.5	10.9	-64	-2.9
65 years and over.....	961	1,013	1,552	10.5	11.4	19.0	-591	-8.5
RATIO: WOMEN/MEN								
All ages.....	1.39	1.37	1.34	1.30	1.29	1.26	(X)	(X)
Under 14 years.....	0.97	0.98	0.94	1.01	1.02	0.97	(X)	(X)
14 to 21 years.....	1.25	1.23	1.12	1.25	1.22	1.07	(X)	(X)
22 to 34 years.....	1.82	1.79	1.72	1.75	1.71	1.64	(X)	(X)
35 to 44 years.....	1.67	1.75	1.56	1.58	1.67	1.49	(X)	(X)
45 to 54 years.....	1.51	1.52	1.71	1.40	1.42	1.56	(X)	(X)
55 to 59 years.....	1.79	1.56	1.89	1.60	1.42	1.71	(X)	(X)
60 to 64 years.....	1.60	1.59	1.68	1.48	1.39	1.46	(X)	(X)
65 years and over.....	2.31	2.27	2.03	1.59	1.59	1.50	(X)	(X)

¹Excludes householders and spouses 14 and 15 years old.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, Nos. 119, 106, and 81.

Table 9-10. Poverty Status of Families, by Sex of Householder and Presence of Family Members Under 18 Years Old: 1977, 1975, and 1970

Numbers in thousands. Families as of the following year. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Sex of householder, poverty status, and presence of family members under 18	1977	1975	1970	Percent change, 1970-77
MALE HOUSEHOLDER, NO HUSBAND PRESENT				
Total families.....	8,236	7,482	5,950	38.4
Below poverty level.....	2,610	2,430	1,934	35.0
Poverty rate.....	31.7	32.5	32.5	-2.5
With related children under 18 years.....	5,709	5,119	3,810	49.8
Below poverty level.....	2,384	2,252	1,665	43.2
Poverty rate.....	41.8	44.0	43.7	-4.3
With no related children under 18 years.....	2,527	2,363	2,140	18.1
Below poverty level.....	225	178	268	-16.0
Poverty rate.....	8.9	7.5	12.5	-28.8
OTHER FAMILIES¹				
Total families.....	48,979	48,763	45,998	6.5
Below poverty level.....	2,701	3,020	3,280	-17.7
Poverty rate.....	5.5	6.2	7.1	-22.5
With related children under 18 years.....	25,928	26,258	26,193	-1.0
Below poverty level.....	1,697	1,921	1,797	-5.6
Poverty rate.....	6.5	7.3	6.9	-5.8
With no related children under 18.....	23,051	22,504	19,806	16.4
Below poverty level.....	1,004	1,100	1,484	-32.3
Poverty rate.....	4.4	4.9	7.5	-41.3
RATIO: FAMILIES WITH FEMALE HOUSEHOLDER/OTHER FAMILIES				
Total families.....	0.17	0.15	0.13	(X)
Below poverty level.....	0.97	0.80	0.59	(X)
Poverty rate ²	5.76	5.24	4.58	(X)
With related children under 18 years.....	0.22	0.19	0.15	(X)
Below poverty level.....	1.40	1.17	0.93	(X)
Poverty rate ²	6.43	6.03	0.63	(X)
With no related children under 18 years.....	0.11	0.11	0.11	(X)
Below poverty level.....	0.22	0.16	0.18	(X)
Poverty rate ²	2.02	1.53	1.67	(X)

¹Married-couple families and families with male householder, no wife present.

²Ratios of poverty rates.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, . 119, 106, and 81.

Table 9-11. Family Status of Persons Below the Poverty Level, by Sex of Householder: 1977, 1975, and 1970

(Numbers in thousands. Persons as of the following year. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Family status	Number below poverty level			Poverty rate			Percent change, 1970-77	
	1977	1975	1970	1977	1975	1970	Number	Rate
FAMILIES								
Persons in families with female householder.....	9,205	8,846	7,503	36.2	37.5	38.1	22.7	-5.0
Householder.....	2,610	2,430	1,951	31.7	32.5	32.5	33.8	-2.5
65 years and over.....	159	143	202	13.7	12.7	19.9	-21.3	-31.2
Related children under 18 years...	5,658	5,597	4,689	50.3	52.7	53.0	20.7	-5.1
Other family members.....	938	819	862	15.8	15.0	17.9	8.8	-11.7
Persons in other families ¹	10,300	11,943	12,828	6.2	7.1	7.7	-19.7	-19.5
Householder.....	2,701	3,020	3,309	5.5	6.2	7.2	-18.4	-23.6
65 years and over.....	551	585	964	7.8	8.3	15.6	-42.8	-50.0
Related children under 18 years...	4,371	5,284	5,546	8.5	9.8	9.2	-21.2	-7.6
Other family members.....	3,228	3,638	3,973	5.0	5.7	6.5	-18.8	-23.1
UNRELATED INDIVIDUALS								
Female.....	3,419	3,422	3,652	26.1	28.9	38.4	-6.4	-32.0
65 years and over.....	1,615	1,716	2,186	28.4	31.9	49.7	-26.1	-42.9
Male.....	1,796	1,667	1,438	18.0	19.9	24.0	24.9	-25.0
65 years and over.....	386	410	549	23.5	27.7	38.9	-29.7	-39.6
RATIO: FEMALE/MALE								
Persons in families ²	0.89	0.74	0.58	5.84	5.28	4.95	(X)	(X)
Householder ²	0.97	0.80	0.59	5.76	5.24	4.51	(X)	(X)
65 years and over ²	0.29	0.24	0.21	1.76	1.53	1.28	(X)	(X)
Related children under 18 years ² ..	1.29	1.06	0.85	5.92	5.38	5.76	(X)	(X)
Other family members ²	0.29	0.23	0.22	3.16	2.63	2.75	(X)	(X)
Unrelated individuals ³	1.90	2.05	2.54	1.45	1.45	1.60	(X)	(X)
65 years and over ³	4.18	4.19	3.98	1.21	1.15	1.28	(X)	(X)

¹Married-couple families and families with male householder, no wife present.

²Ratio of persons in families with female householder to persons in other families.

³Ratio of female unrelated individuals to male unrelated individuals.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, Nos. 119, 106, and 81.

Chapter 10

Voting and Public Officeholding



Voting. Although women are somewhat less likely than men to be registered to vote in Congressional and Presidential elections, the differences in reported registration between the two sexes are minimal. In fact, for the most recent Congressional election (1978), about 63 percent of both women and men reported that they were registered (table 10-1). Age-related registration patterns are also generally the same for both women and men; specifically, the youngest age groups have the lowest registration rates, and the rates increase with advancing age until they drop off at ages 65 years and over for women and 75 years and over for men. In the 1978 Congressional election, the largest differentials between women and men occurred among persons 65 years and over: 73 percent of the women between 65 and 74 years were registered, compared with 79 percent of the men of this age group, and 64 percent of women 75 years and over reported that they were registered, compared with 74 percent of men of that age.

Voting patterns are similar to registration patterns, although the levels of voter participation are considerably lower than those of voter registration (table 10-2). For example, about 46 percent of women and men reported that they voted in 1978 when 63 percent were registered. During recent elections, men overall have been slightly more likely than women to vote, but because women outnumbered men of voting age, more votes were cast by women than by men (figure 10-1). Like registration, voter participation tends to be positively correlated with increasing age—older persons, in general, being more likely to vote than younger ones. Only 20 to 27 percent of women 18 to 24 years reported voting in the 1978 Congressional election, in contrast with about 50 to 60 percent of the women in the age groups between 35 and 64 years of age. Again, the largest sex differentials in voting were found among persons in the oldest age groups.

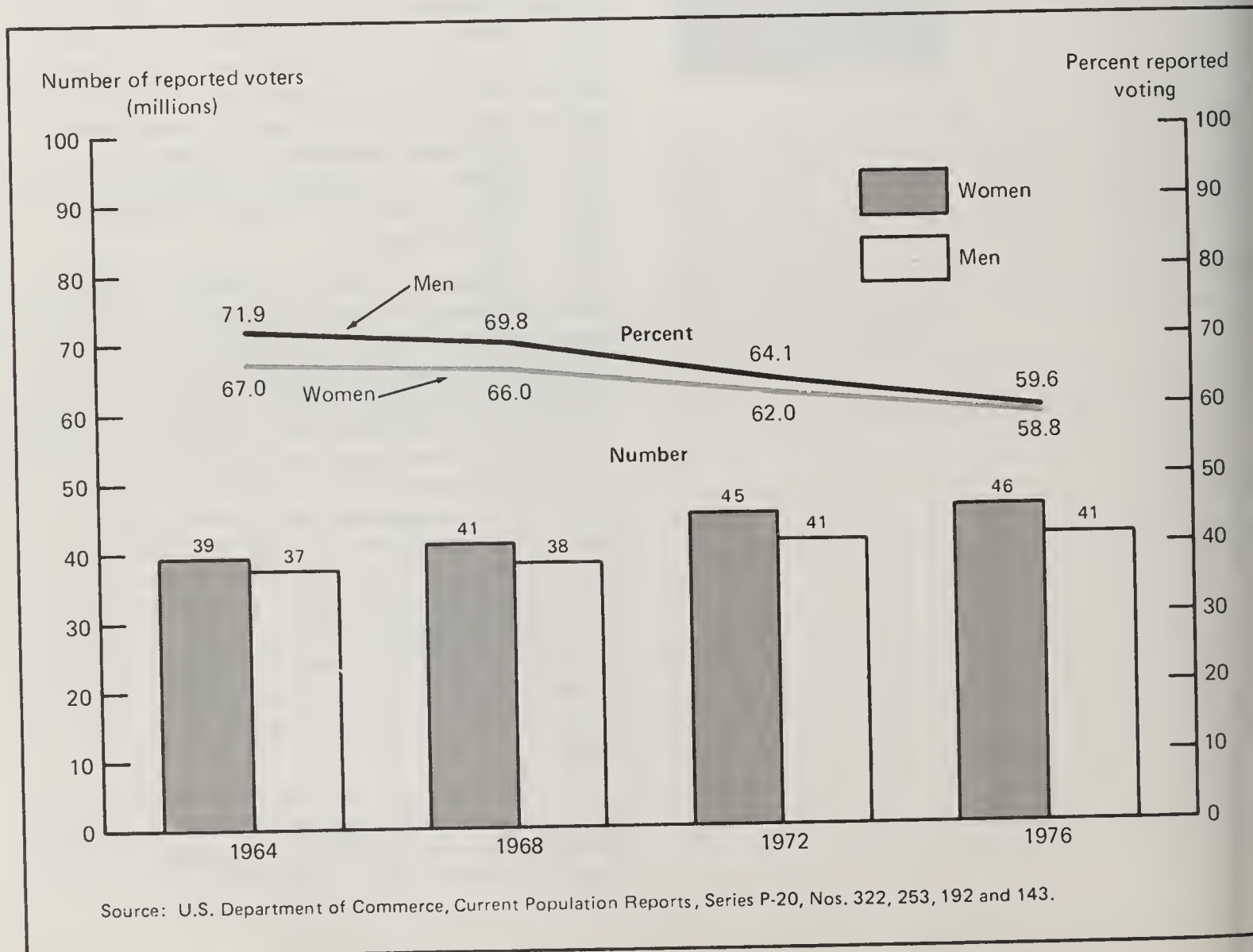
Presidential elections encourage more people to register and vote than do Congressional elections. In the 1976 Presidential election, as a case in point, 66 percent of the female electorate registered and 59 percent voted; in the

1978 Congressional election, 63 percent of the women reported being registered and only 45 percent reported voting.

Registration and voting rates have fallen off in recent elections among women and men alike. The proportion of women who reported voting in the 1978 Congressional election was about 7 percentage points lower than the proportion who voted in the 1970 Congressional election. There was also a decline of about 7 percentage points between the proportion of women who voted in the 1976 Presidential election and the proportion who voted in the 1968 election. The proportion of men who voted fell about 10 percentage points between these same Congressional and Presidential elections.

Public officeholding. The number of women seeking public office and the number elected have increased in recent years. Although the number of women running for the U.S. Congress from the major political parties was the same in 1978 as in 1974 (47), female candidates for State government offices grew from 1,177 in 1974 to 1,395 in 1978 (table 10-3). The number of women in elected public offices increased over the 1974-78 period at the State level, while remaining nearly the same at the Federal level. The 767 female State legislators in 1978 represented an increase of 171 women (29 percent) since 1974; there were 2 female governors in 1978, only 1 in 1974. The number of women in the U.S. Congress declined by 1, from 18 in 1974 to 17 in 1978.

FIGURE 10-1.
Number and Percent of Persons Who Reported Voting in Presidential
Elections, by Sex: 1964 to 1976
(Persons of voting age)



**Table 10-1. Reported Voter Registration Rates for Congressional and Presidential Elections, by Sex and Age:
1968 to 1978**

(Persons of voting age reported registered as a percent of the civilian noninstitutional population in the age group. For meaning of symbols, see text)

Sex and age	Congressional election				Presidential election			
	1978	1974	1970	Percent- age point change, 1970-78	1976	1972	1968	Percent- age point change, 1968-76
Women, 18 years and over..	62.5	61.7	66.8	-4.3	66.4	71.6	72.8	-6.4
18 to 20 years.....	35.5	36.4	(X)	(X)	48.1	58.3	(X)	(X)
21 to 24 years.....	46.1	44.4	40.6	5.5	54.9	60.3	56.3	-1.4
25 to 34 years.....	56.2	55.8	59.8	-3.6	63.1	68.3	68.2	-5.1
35 to 44 years.....	67.4	67.2	70.3	-2.9	70.1	75.1	75.7	-5.6
45 to 54 years.....	72.1	72.1	76.2	-4.1	74.4	78.9	79.9	-5.5
55 to 64 years.....	75.4	73.4	76.4	-1.0	75.4	79.4	79.6	-4.2
65 to 74 years.....	72.8	69.8	72.8	-	71.2	75.1	76.0	-4.8
75 years and over.....	64.2	60.5	63.6	0.6	62.4	64.9	63.4	-1.0
Men, 18 years and over....	62.6	62.8	69.6	-7.0	67.1	73.1	76.1	-9.0
18 to 20 years.....	33.9	36.4	(X)	(X)	46.0	57.9	(X)	(X)
21 to 24 years.....	44.0	46.2	41.2	2.8	54.7	58.6	56.6	-1.9
25 to 34 years.....	54.8	53.5	59.0	-4.2	61.4	68.5	68.6	-7.2
35 to 44 years.....	66.0	66.1	72.3	-6.3	69.5	74.4	77.4	-7.9
45 to 54 years.....	72.4	72.9	77.2	-4.8	74.2	79.9	81.8	-7.6
55 to 64 years.....	77.8	77.0	81.1	-3.3	78.3	81.1	83.3	-5.0
65 to 74 years.....	79.3	77.1	80.9	-1.6	77.7	82.9	83.9	-6.2
75 years and over.....	74.2	73.1	77.8	-3.6	74.5	80.0	77.6	-3.1

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, nos. 332, 322, 293, 253, 228, and 192.

**Table 10-2. Reported Voter Participation Rates for Congressional and Presidential Elections, by Sex and Age:
1968 to 1978**

(Persons of voting age reported voted as a percent of the civilian noninstitutional population in the age group. For meaning of symbols, see text)

Sex and age	Congressional election				Presidential election			
	1978	1974	1970	Percent-age point change, 1970-78	1976	1972	1968	Percent-age point change, 1968-76
Women, 18 years and over..	45.3	43.4	52.7	-7.4	58.8	62.0	66.0	-7.2
18 to 20 years.....	20.0	20.2	(X)	(X)	39.6	48.7	(X)	(X)
21 to 24 years.....	26.9	25.6	30.1	-3.2	46.4	51.7	51.3	-4.9
25 to 34 years.....	38.6	37.4	46.4	-7.8	56.1	59.7	62.3	-6.2
35 to 44 years.....	50.4	49.0	57.1	-6.7	64.1	66.7	70.0	-5.9
45 to 54 years.....	55.7	54.5	62.5	-6.8	67.9	69.9	74.1	-6.2
55 to 64 years.....	59.3	55.5	61.9	-2.6	67.9	69.2	72.4	-4.5
65 to 74 years.....	56.0	51.1	56.2	-0.2	63.0	64.3	67.2	-4.2
75 years and over.....	43.7	38.4	42.5	1.2	50.1	49.2	49.3	0.8
Men, 18 years and over....	46.6	46.2	56.8	-10.2	59.6	64.1	69.8	-10.2
18 to 20 years.....	20.2	21.4	(X)	(X)	36.3	47.7	(X)	(X)
21 to 24 years.....	25.6	27.2	30.8	-5.2	44.7	49.7	50.9	-6.2
25 to 34 years.....	37.3	36.5	46.1	-8.8	54.6	59.7	62.8	-8.2
35 to 44 years.....	49.7	49.2	59.1	-9.4	62.5	65.9	71.7	-9.2
45 to 54 years.....	56.6	57.3	65.2	-8.6	67.9	72.0	76.2	-8.3
55 to 64 years.....	63.4	61.3	67.8	-4.4	71.8	72.4	77.3	-5.5
65 to 74 years.....	65.5	61.8	67.5	-2.0	70.9	73.1	76.9	-6.0
75 years and over.....	56.6	52.4	61.4	-4.8	62.9	65.9	66.3	-3.4

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, Nos. 332, 322, 293, 253, 228, and 192.

**Table 10-3. Number of Women Candidates for Public Office and Number of Women in Elected Public Office:
1978 and 1974**

(For meaning of symbols, see text)

Public office	1978	1974	Percent change, 1974-78
WOMEN CANDIDATES FOR PUBLIC OFFICE			
Federal Government, total.....	47	47	-
U.S. Senate.....	2	3	-33.3
U.S. House of Representatives.....	45	44	2.3
State Government, total.....	1,395	1,177	18.5
Governor.....	1	3	-66.7
House ¹	1,170	989	18.3
Senate ¹	178	137	29.9
Statewide offices (excluding governor).....	46	48	-4.2
WOMEN IN ELECTED PUBLIC OFFICE			
Total ²	786	615	27.4
U.S. Congress.....	17	18	-5.0
State governor.....	2	1	100.0
State legislator.....	767	596	28.7

¹Nebraska has a unicameral legislature.

²Total is the sum of the offices shown and does not include all elected public offices.

Source: National Women's Education Fund. (Reprinted with permission.)

Chapter 11

Crime: Victims and Offenders



In the United States, crime is one of the major social concerns of the decade. Women and men alike are victims of crime and, according to arrest figures, women have been committing increasing proportions of major crimes, both violent and property crimes. Women were victimized by violent crimes at about one-half the rate for men in 1977. According to the National Crime Survey (NCS), about 22 of every 1,000 women 12 years old and over were victims of some sort of violent crime in 1977, compared with 46 of every 1,000 men of the same age. Rape affected 2 per 1,000 women in 1977, a smaller proportion than robbery or assault, but still significant. The figure for rape was as high as 5 per 1,000 women 16 to 19 years old, or about 1 in 200 young women. According to Federal Bureau of Investigation (FBI) statistics, about 1 in 4 murder victims was a woman. The murder rate was quite small compared with rates for other crimes; about 4 per 100,000 women were murdered in 1977.

Victimization. For all crimes of violence in 1977, there were about 5 women for every 10 men victimized (table 11-1). For the other type of crime against persons, crimes of theft, the ratio was about 8 to 10. The incidence of crimes of theft far outweighs violent crimes for both women and men. About 4 of every 5 personal crimes against women are crimes of theft. Violent crimes in the NCS include rape, robbery (with and without injury), and assault (aggravated and simple), but they exclude murder and kidnapping. Personal crimes of theft (personal larceny) include purse snatching, pocket picking, and other forms of theft of personal property with or without contact of the offender with the victim.

Age was a significant factor in determining the risk of being victimized in 1977 (figure 11-1). For both women and men, the likelihood of being victims of violent crime was greatest for young persons. The highest rates of victimization among women were for persons 12 to 24 years old, with each successively older age group reporting lower rates. Victimization rates for the age groups 12 to 15 years, 16 to 19 years, and 20 to 24 years were not significantly different from one another. This situation occurred for both violent crimes and

crimes of theft. The differences in rates were most likely attributable to changes in lifestyle and living patterns that take place during the period of life when people begin to settle into their own family households. A woman's mobility and vulnerability as a single person change as she gets older and her lifestyle changes. In fact, despite the lower victimization rates for women compared with men, women 12 to 25 years old were about three times more likely to be victimized by violent crimes than were men 50 years old and over.

Marked differences in victimization rates were also discerned by marital status. Separated and divorced women as a group had the highest rates of victimization from violent crimes in 1977, most notably from robbery and assault. Corresponding rates were smaller for never-married women. For all types of violent crimes except robbery with injury, the incidence of crime against married and widowed women was significantly lower than for women of other marital statuses.

Many victims, particularly victims of less serious crimes, do not report the incident to police. In 1977, about one-half of the violent crimes but only around one-fourth of the personal crimes of theft were reported to police by women who were victimized, according to the NCS (table 11-2). Of the crimes covered in the NCS, women were most likely to report robbery with injury (about 3 of every 4 cases), possibly because it was reported when medical treatment was administered. About 6 of 10 rapes or attempted rapes were reported to police. For robbery without injury and for aggravated assault, the proportions reported by women were not significantly different from rape, but women victimized by simple assault filed reports in roughly 4 of every 10 cases. Among women and men alike, about 1 in 4 victims of theft reported the crime to police. Women were somewhat more likely than men to report violent crimes to police; in fact, women were more likely than men to report all types of crimes except aggravated assault, for which the rates of reporting for women and men did not differ significantly. Of all violent crimes, both sexes were least likely to report simple assaults.

Most violent crimes against persons as reported by victims in the NCS were committed by strangers (63 percent) in 1977, but a substantial proportion of the victims were at least acquainted with the offenders. Roughly one-half the female victims claimed that they knew the offenders and about one-third of the male victims said that the assailants

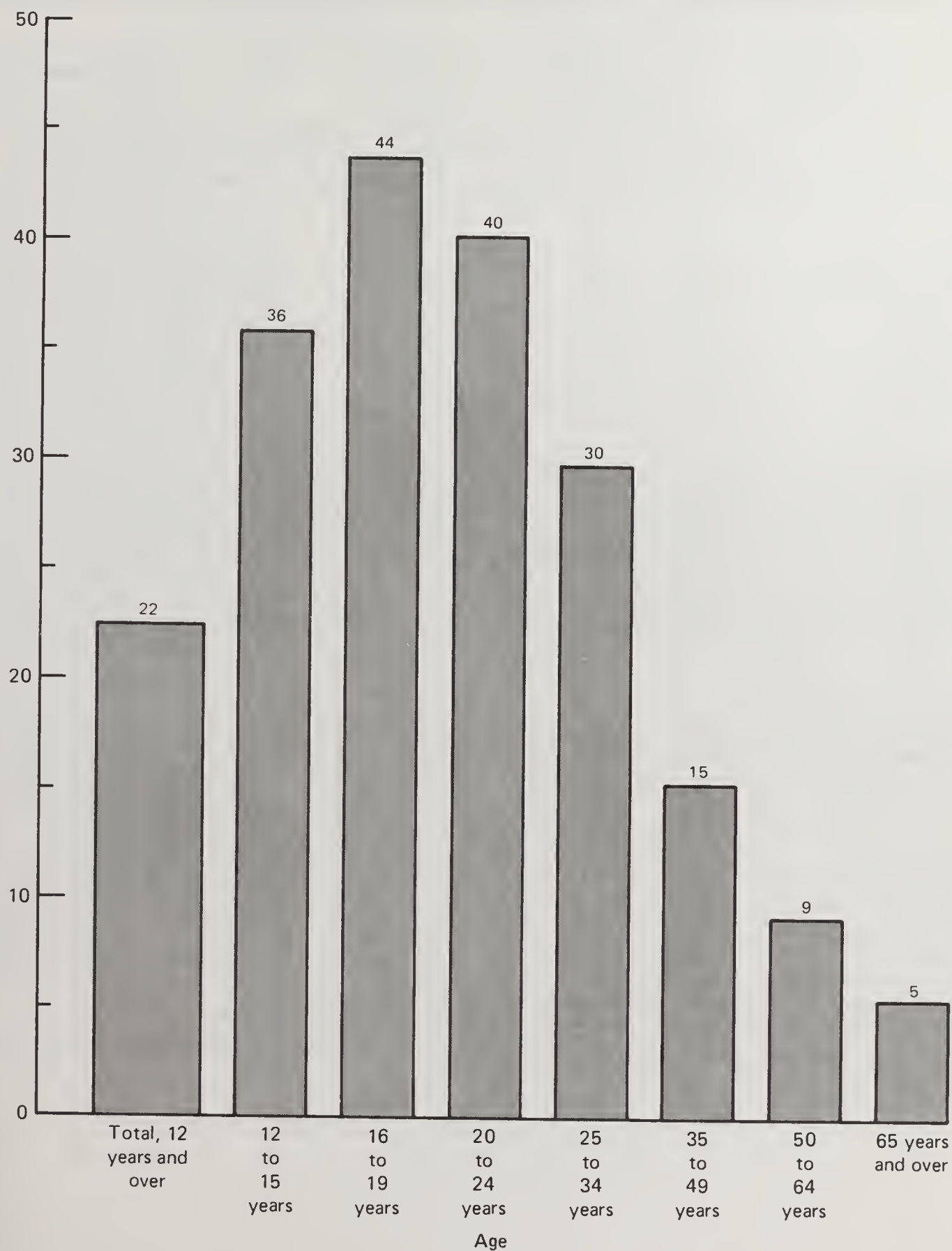
were at least acquaintances. Among women, approximately one-half of the assaults were by acquaintances, family members, or friends, compared with about one-fourth of the robberies and about one-third of the rapes or attempted rapes. Both women and men were more likely to report crimes to the police if the offenders were strangers rather than nonstrangers.

Arrests. Arrest data from reports of local police jurisdictions to the FBI show another picture of women's involvement in crime (table 11-3). Although women accounted for about one-third of victimizations from violent crimes in the NCS, they accounted for one-sixth of all arrests of suspected offenders according to the FBI's *Uniform Crime Reports*. Women represented only 1 in 10 persons arrested for violent crimes in 1977 but nearly 1 in 4 persons arrested for property crimes, predominantly larcenies. The crimes incorporated into the FBI's crime index are violent crimes (including criminal homicide, rape, robbery, and aggravated assault) and property crimes (including burglary, larceny, and auto theft). Women were not involved very heavily in any of these major crimes except larceny (including shoplifting), for which they constituted nearly one-third of all arrests in 1977. Since 1970, the rates of arrest for both women and men have increased, and arrests of women have risen slightly as a proportion of all arrests for violent crimes as well as property crimes.

Incarceration. A further indication of women's intensified participation in crime in recent years is the increase from 1971 to 1977 in the number of women incarcerated (table 11-4). The proportional increase over the 6-year period was considerably greater for women than for men, but women still represented only a small fraction of the prisoners in State and Federal institutions in 1977 (4 percent in 1977 versus 3 percent in 1971). However, the number of women in State and Federal prisons increased by about three-fourths from 1971 to 1977, while the number of male prisoners rose by only two-fifths. Women are less likely to be arrested than men, probably because they commit fewer crimes. In addition, they are far less likely to be incarcerated for long periods (more than 1 year), probably because they tend to commit less serious crimes. In 1977, women represented 16 percent of arrests but only 4 percent of prisoners.

FIGURE 11-1.
Victimization Rates for Violent Crimes Against Women, by Age: 1977

Victimizations per
1,000 women



Source: U.S. Department of Justice, Law Enforcement Assistance Administration, unpublished 1977 National Crime Survey data.

Table 11-1. Victimization Rates for Crimes Against Persons, by Age, Sex, and Marital Status: 1977

(Numbers in thousands. Rate is number of victimizations per 1,000 persons 12 years and over. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Age, sex, and marital status	Total persons	Victimization rates								Crimes of theft
		Crimes of violence								
		Total	Rape	Robbery			Assault			
				Total	With injury	Without injury	Total	Aggra- vated	Simple	
AGE										
Women, 12 years and over.....	90,696	22.4	1.6	4.0	1.4	2.5	16.9	4.9	12.0	87.5
12 to 15 years.....	7,839	35.8	2.7	4.4	¹ 0.9	3.4	28.8	6.6	22.2	126.9
16 to 19 years.....	8,299	43.7	5.3	5.8	1.6	4.2	32.7	9.0	23.7	134.2
20 to 24 years.....	9,924	40.1	2.9	5.6	2.4	3.2	31.6	9.9	21.7	132.1
25 to 34 years.....	16,694	29.7	1.8	4.1	1.6	2.5	23.8	7.1	16.7	111.8
35 to 49 years.....	17,964	15.2	0.8	3.2	0.9	2.3	11.3	3.5	7.8	85.6
50 to 64 years.....	16,810	9.2	¹ 0.1	3.4	1.1	2.3	5.7	1.9	3.8	51.0
65 years and over.....	13,167	5.4	¹ 0.2	2.8	1.8	1.0	2.3	¹ 0.9	1.4	19.0
Men, 12 years and over.....	83,397	46.4	¹ 0.2	8.7	3.1	5.6	37.5	15.5	22.1	107.9
12 to 15 years.....	8,124	76.5	¹ 0.5	17.2	4.3	12.8	58.8	19.4	39.3	160.8
16 to 19 years.....	8,206	92.0	¹ 0.2	13.3	4.8	8.6	78.5	37.2	41.3	165.5
20 to 24 years.....	9,510	87.5	¹ 0.5	12.8	5.0	7.8	74.2	29.9	44.3	176.6
25 to 34 years.....	16,122	54.8	¹ 0.1	8.5	3.6	4.9	46.2	19.8	26.4	117.7
35 to 49 years.....	16,949	24.9	1-	5.9	2.0	3.9	19.1	7.8	11.2	88.4
50 to 64 years.....	15,211	16.8	¹ 0.1	5.2	1.6	3.6	11.5	4.9	6.5	64.5
65 years and over.....	9,274	10.5	1-	4.2	2.1	¹ 2.0	6.4	1.7	4.7	30.2
MARITAL STATUS										
Women, 12 years and over ²	90,696	22.4	1.6	4.0	1.4	2.5	16.9	4.9	12.0	87.5
Never married.....	23,811	38.2	3.3	5.4	1.8	3.6	29.5	8.1	21.4	125.7
Married.....	49,424	12.0	0.5	2.0	0.5	1.5	9.6	2.7	6.8	74.3
Separated or divorced....	7,214	61.2	4.5	12.7	5.2	7.6	44.0	14.3	29.6	126.8
Widowed.....	10,013	8.3	¹ 0.7	3.6	2.0	¹ 1.6	3.9	¹ 1.3	2.7	33.5
Men, 12 years and over ²	83,397	46.4	¹ 0.2	8.7	3.1	5.6	37.5	15.5	22.1	107.9
Never married.....	27,043	78.4	¹ 0.3	14.6	4.7	9.9	63.5	25.4	38.0	161.5
Married.....	50,090	27.3	1-	4.2	1.5	2.7	23.1	9.5	13.6	76.8
Separated or divorced....	4,187	75.5	1-	21.8	10.6	11.2	53.7	28.1	25.6	157.0
Widowed.....	1,861	25.6	1-	12.7	¹ 5.2	¹ 7.5	12.9	¹ 3.4	9.6	58.3

¹Estimate, based on 10 or fewer sample cases, is statistically unreliable.

²Includes persons for whom marital status was not reported, not shown separately.

Source: U.S. Department of Justice, Law Enforcement Assistance Administration, unpublished 1977 National Crime Survey data.

Table 11-2. Percent of Victimizations Involving Strangers and Percent Reported to Police, by Type of Crime and Sex of Victim: 1977

Numbers in thousands. Noninstitutional population 12 years and over excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Victimizations involving strangers, reported to police, and sex	Crimes of violence								Crimes of theft ¹
	Total	Rape	Robbery			Assault			
			Total	With injury	Without injury	Total	Aggra- vated	Simple	
Total crimes against women 12 years and over.....	2,035	142	358	128	229	1,535	448	1,087	7,931
Total crimes against men 12 years and over.....	3,866	12	725	258	467	3,129	1,290	1,839	9,002
Percent involving strangers:									
Women.....	52.8	65.3	73.1	64.1	78.2	47.0	49.5	45.9	(X)
Men.....	68.3	² 53.4	81.0	80.9	81.1	65.4	67.5	64.0	(X)
Percent reported to police:									
Women.....	50.9	59.5	63.6	73.9	57.9	47.1	55.7	43.6	25.3
Involving strangers.....	54.4	65.1	65.7	76.4	60.9	48.9	55.0	46.2	(X)
Involving nonstrangers.....	46.9	49.1	57.8	69.4	47.2	45.5	56.4	41.3	(X)
Men.....	43.6	² 45.8	51.5	62.3	45.6	41.8	50.0	36.0	24.4
Involving strangers.....	46.3	² 19.0	52.0	61.2	46.9	44.8	51.5	40.1	(X)
Involving nonstrangers.....	37.8	² 76.7	49.7	67.1	40.0	36.1	47.8	28.8	(X)

¹The distinction between stranger and nonstranger is not made for crimes of theft because the victims rarely see the offenders.

²Estimate, based on 10 or fewer sample cases, is statistically unreliable.

Source: U.S. Department of Justice, Law Enforcement Assistance Administration, unpublished 1977 National Crime Survey data.

Table 11-3. Arrest Rates for the Total Population and for Women, by Type of Crime: 1977 and 1970

(For meaning of symbols, see text)

Type of crime	Rate per 100,000 persons				Percent women		
	1977		1970		1977	1970	Percentage-point change, 1970-77
	Total arrests	Arrests of women	Total arrests	Arrests of women			
All arrests.....	4,732.7	759.0	4,334.0	624.6	16.0	14.4	1.6
Violent crime.....	202.7	21.1	159.6	15.3	10.4	9.6	0.8
Murder and non-negligent manslaughter.....	9.0	1.3	8.5	1.3	14.5	15.4	-0.9
Forcible rape.....	13.5	0.1	10.2	-	1.1	-	1.1
Robbery.....	64.2	4.8	57.8	3.5	7.4	6.1	1.3
Aggravated assault.....	116.0	14.9	83.1	10.5	12.8	12.6	0.2
Property crime.....	836.7	187.6	678.6	126.7	22.4	18.7	3.7
Burglary (breaking and entering).....	238.1	14.3	188.3	8.8	6.0	4.7	1.3
Larceny (theft).....	527.8	167.6	406.4	113.6	31.8	27.9	3.9
Motor vehicle theft.....	70.9	5.8	84.0	4.3	8.1	5.1	3.0
Other crimes.....	3,693.3	550.3	3,495.8	482.6	14.9	13.8	1.1

Source: U.S. Department of Justice, Federal Bureau of Investigation, Uniform Crime Reports for the United States, 1977 and 1970.

Table 11-4. Sentenced Prisoners in State and Federal Institutions, by Sex: 1971 to 1977

(The prisoner population consists of only those inmates in the custody of State or Federal correctional systems who had been sentenced as adult or youthful offenders to a maximum term of more than 1 year)

Year	Women			Men		
	All institutions	Federal institutions	State institutions	All institutions	Federal institutions	State institutions
1977.....	11,044	1,694	9,350	267,097	26,956	240,141
1976.....	10,039	1,459	8,580	252,794	25,521	227,273
1975.....	8,675	1,105	7,570	231,918	23,026	208,892
1974.....	7,389	994	6,395	211,077	21,367	189,710
1973.....	6,684	932	5,752	197,527	21,883	175,644
1972.....	6,269	794	5,475	189,823	20,919	168,904
1971.....	6,329	768	5,561	191,732	20,180	171,552
Percent change, 1971-77	74.5	120.6	68.1	39.3	33.6	40.0

Source: U.S. Department of Justice, Law Enforcement Assistance Administration, Prisoners in State and Federal Institutions on December 31, annual issues 1971 to 1977.

Chapter 12

Black Women



In the text of this chapter, the term "Black" is used although some of the data are for Black and other races. Blacks constitute about 90 percent of this group.

Social characteristics. In the 1970's, Black women have made improvements in the areas of health, education, occupational upgrading, and in achieving incomes more nearly equal to those of White women. Nevertheless, unemployment rates for Black women have remained high, and in 1978, Black women still fell below White women in most socioeconomic areas. Black women were more likely than White women to be unemployed, to be overrepresented in low-paying jobs, to be increasingly assuming the role of family householder with children to support, and to account for a larger proportion of the poor.

In 1978, there were 13.2 million Black women in the United States, representing an increase of 1.4 million, or 12 percent, over the 11.8 million in 1970 (table 12-1). About three-fourths of all Black women resided in metropolitan areas in 1978, and more than one-half (56 percent) of all Black women lived in central cities within these areas (table 12-2). One of every five Black women in the United States lived in the suburbs (outside the central cities) of metropolitan areas.

Black women are, on the average, younger than White women. In 1978, the median age of Black women was 25.2 years, compared with 31.5 years for White women. About 8 percent of Black women were 65 years old and over in 1978, compared with 13 percent of White women. The number of elderly Black women, however, increased by 26 percent since 1970, as compared with a 13-percent increase for White women. The relatively larger increase in the number of elderly Black women is partly a reflection of the greater reductions in age-specific mortality rates for Black women than for White women.¹

During the 1970's, the differential between Black women and White women in life expectancy at birth has narrowed (table 12-3). In 1976, the difference in average length of life expected between Black women and White women was 4.7 years, as compared with 6.2 years in 1970. Life expectancy of Black women increased by 3.2 years in the 6-year period. Despite these improvements in longevity, Black women continue to have a lower life expectancy than White women.

¹ U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, *Monthly Vital Statistics Report*, Vol. 26, No. 12.

Among Black women, the average life expectancy at birth in 1976 was 72.6 years, as compared with 77.3 years for White women.

Death rates for most of the 10 leading causes of death (as ranked according to the total population) showed modest to substantial declines for Black women during the first 6 years of the 1970's (table 12-4). Substantial declines were noted for diseases of the heart (the leading cause of death for Black women in 1976) and cerebrovascular diseases (the third leading cause of death for Black women in 1976).

During this decade, Black women have contributed to the increasing proportion of adults who never marry. In 1978, 35 percent of Black women were never married, as compared with 28 percent in 1970 (table 12-5). Only one-third of Black women were married and living with their husbands, as compared with 58 percent of White women. The proportion of Black women with a husband present declined by 9 percentage points between 1970 and 1978, as compared with a decline of 3 percentage points for White women.

The period from 1975 to 1978, like the first half of the 1970 decade, has been characterized by a rise in the proportion of Black families maintained by women with no husband present (table 12-6). In 1978, 39 percent of Black families were maintained by a woman, as compared with 35 percent in 1975 and 28 percent in 1970. In contrast, 12 percent of White families were maintained by women in 1978. In addition, the proportion of Black families maintained by a woman who had two or more own children under 18 years old present (46 percent) was higher than that of similar White families (32 percent).

In 1978, Black women 18 to 44 years old had higher rates of children ever born than White women of the same age (table 12-7). However, among currently married Black women 25 to 34 years old, the average number of births to date and the average lifetime births expected have declined since 1971 (table 12-8). The decline noted among these Black women, like that among women in general, may reflect changes in attitudes toward family planning and family size.

Education is one area in which Black women have continued to make major advancements. During the 1970's, there has been a continuation of the trend for more Black women to be enrolled at the college level (table 12-9). In 1978, 569,000 Black women 14 to 34 years old were enrolled in college, as compared with 269,000 in 1970, an increase of 112 percent. In fact, the proportion of Black women 14 to 34 years old enrolled in college in 1978 was not significantly different from the proportion of comparable White women. The number of Black men of this age enrolled in college has also expanded over the same period; however, the growth has not been so pronounced as that for Black women.

Although Black women have made strides in the 1970's toward achieving educational parity with White women, equality has not been reached. By 1978, the proportion of

Black women 25 to 29 years old who were high school graduates (including those going on to college) reached 76 percent; this level was substantially above the 58 percent who were high school graduates in 1970 (table 12-10 and figure 12-1). Yet in 1978, an educational gap still remained between Black women and White women, as is seen in the fact that 86 percent of White women of this age group had completed high school. An educational disparity also existed between older and younger Black women; in 1978, only 16 percent of Black women 65 years old and over were high school graduates (table 12-11).

Economic characteristics. Traditionally, the labor force participation rate for Black women has been greater than that for White women. In the 1970's, however, the labor force participation rate of White women has been approaching that of Black women (table 12-12). In 1978, the participation rate for Black women was 53 percent, only 4 percentage points above the rate for White women. Over the past 8 years, the rate for Black women has increased less than the rate for White women (4 and 7 percentage points, respectively). Nonetheless, in 1978, as in previous years, the labor force participation rates of both Black women and White women were still substantially below those of their male counterparts. For example, there were 74 Black women per 100 Black men in the labor force in 1978.

In 1978, the presence of young children in the family continued to have a lesser effect on the labor force status of Black women than on that of White women (table 12-13). Among married women with husband present, about 58 percent of Black mothers with children under 6 years were members of the labor force in 1978, a figure 18 percentage points higher than the proportion of comparable White mothers (40 percent). These proportions represent about an 11-percentage-point increase since 1970 for both married Black mothers and married White mothers.

Unemployment is more prevalent among Black women than among White women (table 12-15). In 1978, 13.1 percent of Black women were unemployed, as compared with 6.2 percent of White women. Unemployment among women of both races has generally shown improvement. From 1975 to 1978, there is some evidence that joblessness for Black women declined slightly from 14.0 to 13.1. In contrast, unemployment among White women declined substantially, falling from 8.6 percent in 1975 to 6.2 percent in 1978.

In 1978, the proportions of employed Black women and Black men in white-collar jobs (professional, managerial, sales, and clerical occupations) were 47 and 27 percent, respectively (table 12-17). However, the majority of Black women in white-collar jobs, like corresponding White women, held clerical positions. One-third (33 percent) of employed Black women held jobs as service workers; the majority (54 percent) of employed Black men were found in blue-collar jobs.

Since 1970, there have been some changes in the occupational distribution of Black women. A larger proportion of employed Black women held professional and clerical jobs in 1978 than at the beginning of the decade; the proportion of White women in these jobs remained about the same. However, in 1978, the proportion of Black women employed in these positions was still below that of their White counterparts. Over the same period, the proportion of Black women employed as service workers declined from 43 to 33 percent, entirely as a result of a decrease in the proportion employed as private household workers (from 18 percent in 1970 to 8 percent in 1978). In contrast, Black men experienced about a 3-percentage-point increase in the proportion holding service worker jobs during this period.

Black women continued to comprise a disproportionately small share of employed women holding high-paying, high-status jobs. For example, in 1978, Black women constituted about 13 percent of all employed women but held only about 10 percent of all professional and managerial jobs among women.²

During the 1970's, the gains in income for Black women who were income recipients have been somewhat less striking than those recorded for White women (table 12-18). From 1970 to 1977, the median income of Black women, expressed in 1977 purchasing power, rose by 7 percent (from \$3,220 to \$3,460), while the income level of White women rose by 13 percent (from \$3,540 to \$4,000). Although increases were noted in the income levels for women of both races during this period, the median income ratio of Black women to White women experienced a decline—from 0.91 in 1970 to 0.86 in 1977.

The difference in earnings between Black women and White women who were year-round, full-time workers has narrowed significantly since 1970 (figure 12-2). The median earnings ratio of Black to White women rose from 82 percent in 1970 to 93 percent in 1977. During this period, in terms of 1977 dollars, the median earnings of Black women increased 17 percent to its 1977 level of \$8,100, whereas the median earnings of White women grew at a much slower rate (3 percent) to \$8,670.

Although the median income of Black women who worked year round full time was approaching income parity with their White counterparts during the 1970's, a similar situation did not develop for Black women relative to Black men (table 12-19). The median income ratio of women to men for Blacks increased by only 8 percentage points, from 70 percent in 1970 to 78 percent in 1977.

About 60 percent of the 7.7 million Blacks below the poverty level in 1977 were living in families maintained by a woman—a noticeable increase over the 48 percent recorded in 1970 (table 12-20). Although the number of members in these families maintained by women increased between 1970 and 1977, there is some evidence that their poverty rate decreased, from 59 percent in 1970 to 55 percent in 1977. Among Black persons in families maintained by a man (with or without wife present), both the number and proportion who were poor declined during this period. In 1977, as in 1970, a large proportion of poor Black family members were related children under 18 years old; about 75 percent of these children were in families maintained by a woman.

Both Black families and White families maintained by a woman with no husband present were more likely to be poor in 1977 than families maintained by a man with no wife present. Among families maintained by a woman, the poverty rate for Blacks was 51 percent, compared with 24 percent for their White counterparts in 1977.

Families maintained by a woman with no husband present have comprised an increasing proportion of both Black families and White families in poverty; however, families maintained by a woman have become an overwhelming majority only among poor Black families (table 12-21). At the beginning of the decade, 56 percent of all poor Black families were maintained by women; by 1977, the proportion had grown to 71 percent. For the comparable group of White families, the proportions were 30 percent and 40 percent, respectively.

Voter participation. Thirty-eight percent of Black women reported that they voted in the Congressional election of 1978 (table 12-22). This turnout was about 4 percentage points higher than the voter participation rate of Black women in the 1974 Congressional election. A slight increase in voter participation was also noted for White women. The turnout for women of both races, however, was significantly below that for the last Presidential election (1976). As with the general population, a smaller proportion of Black women vote in Congressional elections than in Presidential elections.

Crime victimization. The total victimization rate for crimes of violence was higher for Black women than for White women in 1977 (table 12-23). For crimes of theft, White women were the more likely victims. Black women 25 years old and over had a higher victimization rate than their White counterparts for crimes of violence, but there was no significant difference between the corresponding rates for younger women of each race.

²U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 26, No. 1.

FIGURE 12-1.

Years of School Completed by Women 25 to 29 Years Old, by Race: 1970, 1975, and 1978

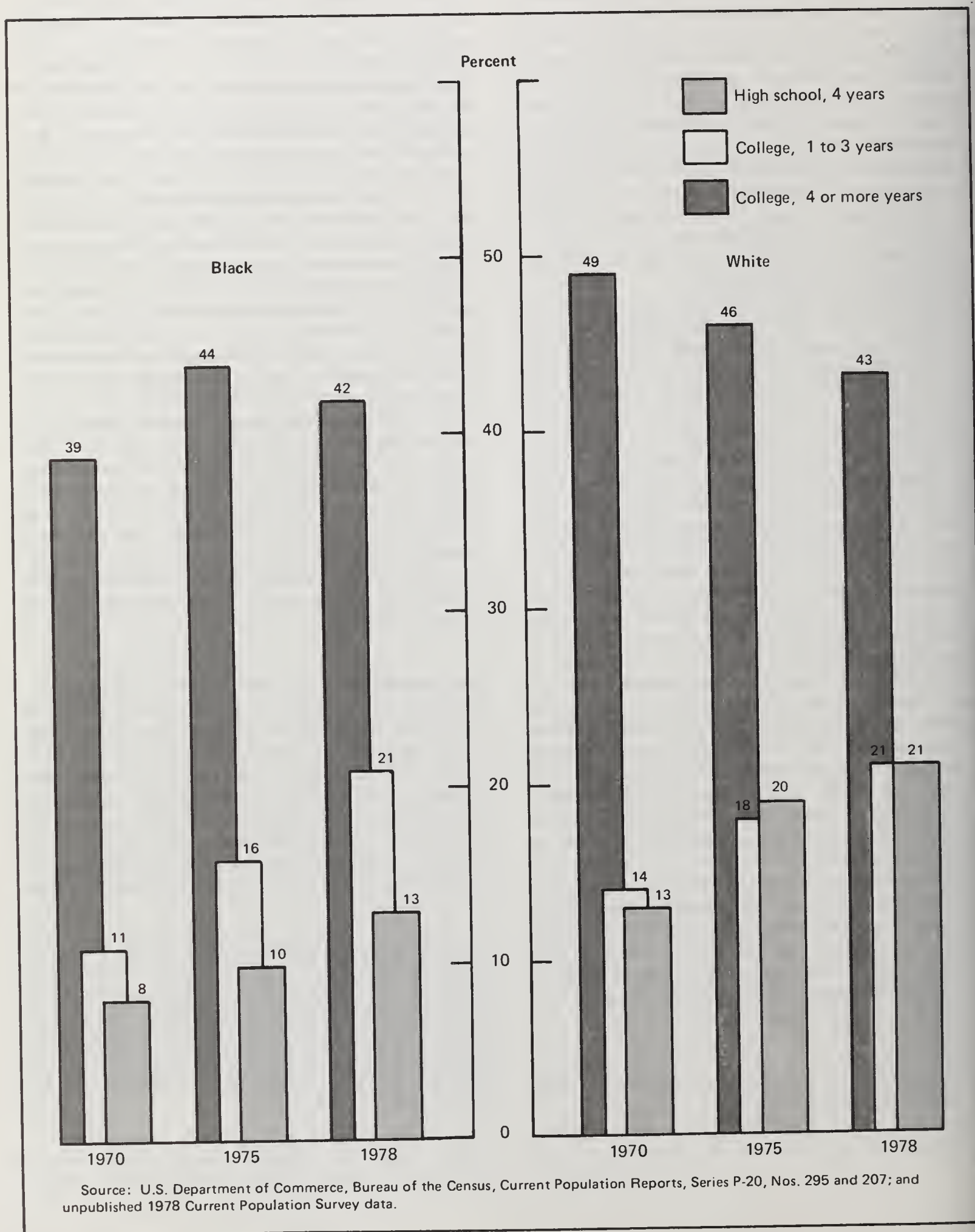


FIGURE 12-2.
Median Earnings of Year-Round, Full-Time Workers With Income, by Race and Sex: 1970 to 1977
(Persons 14 years and over)

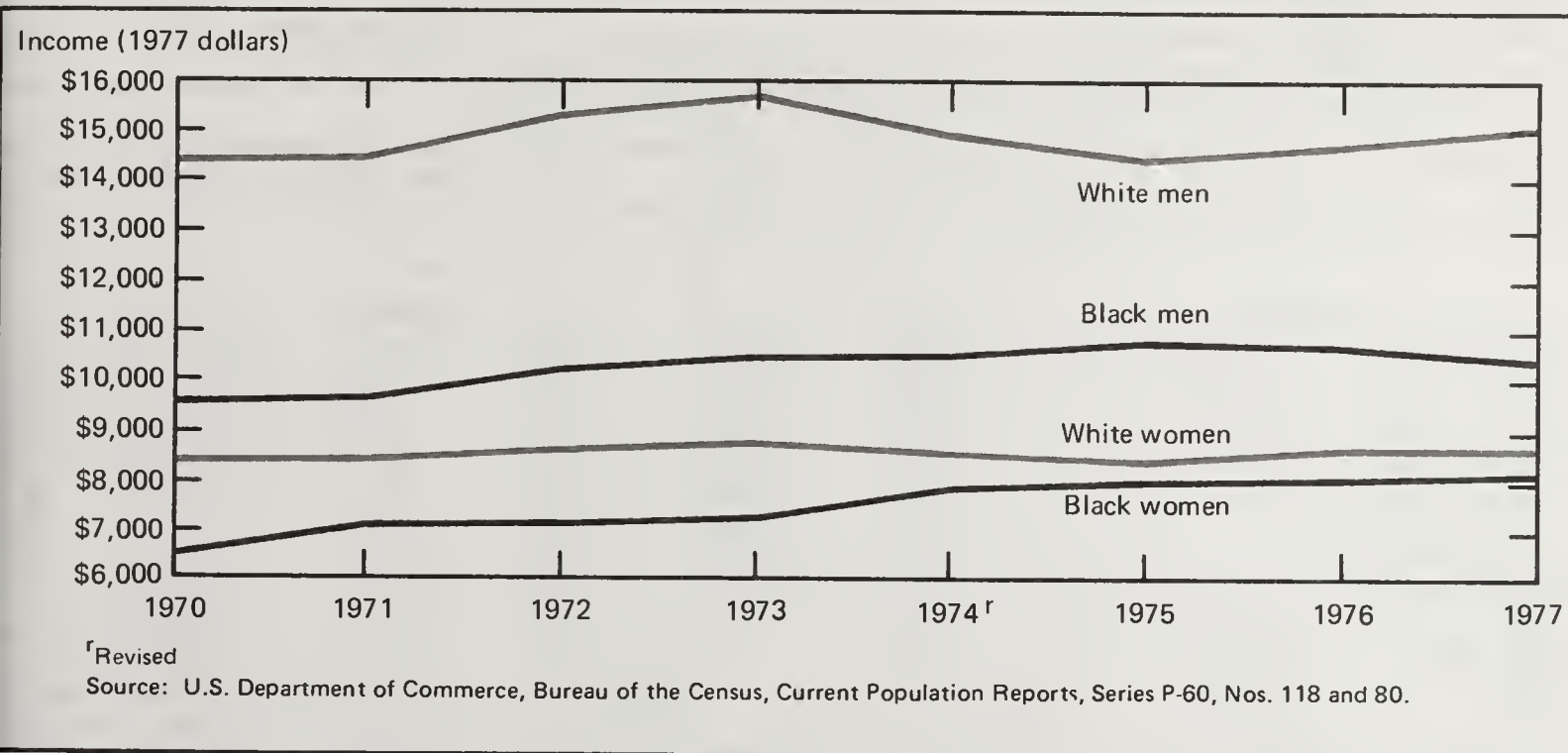


Table 12-1. Female Population, by Age and Race: 1978, 1975, and 1970

(Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks for 1978 and 1975; resident population for 1970. For meaning of symbols, see text)

Year and age	Number		Percent		Sex ratio ¹	
	Black	White	Black	White	Black	White
1978						
Total, all ages.....	13,208	95,144	100.0	100.0	88.1	94.9
Under 15 years.....	3,821	20,637	28.9	21.7	101.4	104.9
Under 5 years.....	1,189	6,140	9.0	6.5	102.4	105.2
5 to 14 years.....	2,632	14,497	19.9	15.2	100.8	104.8
15 to 24 years.....	2,738	17,158	20.7	18.0	89.5	99.0
25 to 44 years.....	3,366	25,121	25.5	26.4	78.8	97.8
25 to 34 years.....	1,951	14,498	14.8	15.2	80.2	98.9
35 to 44 years.....	1,415	10,623	10.7	11.2	77.0	96.4
45 to 64 years.....	2,174	20,161	16.5	21.2	84.5	93.2
65 years and over.....	1,111	12,067	8.4	12.7	73.7	68.4
Median age.....	25.2	31.5	(X)	(X)	(X)	(X)
1975 ^r						
Total, all ages.....	12,646	93,604	100.0	100.0	88.1	95.0
Under 15 years.....	3,877	22,108	30.7	23.6	101.3	104.3
Under 5 years.....	1,195	6,512	9.4	7.0	101.5	105.1
5 to 14 years.....	2,682	15,596	21.2	16.7	101.2	104.0
15 to 24 years.....	2,597	16,690	20.5	17.8	88.1	99.3
25 to 44 years.....	3,057	23,343	24.2	24.9	79.0	97.9
25 to 34 years.....	1,724	13,270	13.6	14.2	79.8	98.8
35 to 44 years.....	1,333	10,073	10.5	10.8	78.0	96.8
45 to 64 years.....	2,119	20,150	16.8	21.5	84.1	91.9
65 years and over.....	995	11,313	7.9	12.1	73.0	69.8
Median age.....	24.3	30.6	(X)	(X)	(X)	(X)
1970						
Total, all ages.....	11,832	91,028	100.0	100.0	90.8	95.3
Under 15 years.....	3,986	23,961	33.7	26.3	100.4	104.5
Under 5 years.....	1,213	7,049	10.3	7.7	100.5	104.6
5 to 14 years.....	2,773	16,912	23.4	18.6	100.4	104.5
15 to 24 years.....	2,196	15,420	18.6	16.9	92.9	98.8
25 to 44 years.....	2,765	21,353	23.4	23.5	83.5	97.2
25 to 34 years.....	1,456	11,004	12.3	12.1	84.2	97.9
35 to 44 years.....	1,309	10,349	11.1	11.4	82.8	96.4
45 to 64 years.....	2,002	19,609	16.9	21.5	85.8	92.0
65 years and over.....	883	10,685	7.5	11.7	76.6	71.6
Median age.....	23.6	30.2	(X)	(X)	(X)	(X)

^r Revised.

¹Number of males per 100 females.

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. I, U.S. Summary; and unpublished 1978 and 1975 Current Population Survey data.

Table 12-2. Percent Distribution of the Female Population, by Metropolitan-Nonmetropolitan Residence and Race:
1978, 1975, and 1970

Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks)

Race and type of residence	1978	1975 ^r	1970
BLACK			
United States.....	13,208	12,646	11,693
Percent.....	100.0	100.0	100.0
Metropolitan areas ¹	74.7	75.5	74.4
In central cities.....	55.7	58.8	59.1
Outside central cities.....	19.0	16.7	15.3
Nonmetropolitan areas.....	25.3	24.5	25.6
WHITE			
United States.....	95,144	93,604	90,357
Percent.....	100.0	100.0	100.0
Metropolitan areas ¹	65.7	66.9	68.1
In central cities.....	24.4	25.6	28.5
Outside central cities.....	41.3	41.3	39.6
Nonmetropolitan areas.....	34.3	33.1	31.9
RATIO: BLACK/WHITE ²			
Metropolitan areas ¹	1.14	1.13	1.09
In central cities.....	2.28	2.30	2.07
Outside central cities.....	0.46	0.40	0.39
Nonmetropolitan areas.....	0.74	0.74	0.80

^r Revised.

¹Figures relate to the 243 standard metropolitan statistical areas (SMSA's) as defined in 1970 census publications.

²Ratios of percents in the area.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-23, No. ; and unpublished 1978 and 1975 Current Population Survey data.

Table 12-3. Life Expectancy of Women at Selected Ages, by Race: 1970 to 1976

(Additional years of life expected)

Year and race	At birth	1 year	15 years	25 years	45 years	65 years
1976						
Black and other races.....	72.6	73.3	59.7	50.2	32.1	17.6
White.....	77.3	77.2	63.6	53.9	34.9	18.1
Difference (years).....	-4.7	-3.9	-3.9	-3.7	-2.8	-0.5
1974						
Black and other races.....	71.2	71.8	58.3	48.8	31.1	16.7
White.....	76.6	76.6	62.9	53.3	34.3	17.6
Difference (years).....	-5.4	-4.8	-4.6	-4.5	-3.2	-0.9
1972						
Black and other races.....	69.9	70.8	57.3	47.9	30.3	16.3
White.....	75.9	75.9	62.3	52.7	33.8	17.1
Difference (years).....	-6.0	-5.1	-5.0	-4.8	-3.5	-0.8
1970						
Black and other races.....	69.4	70.4	57.0	47.5	30.1	16.4
White.....	75.6	75.8	62.2	52.5	33.7	17.1
Difference (years).....	-6.2	-5.4	-5.2	-5.0	-3.6	-0.7

Source: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Monthly Vital Statistics Report, Vol. 26, No. 12; Vol. 24, No. 11; and Vital Statistics of the United States, 1972 and 1970, Vol. II, "Mortality."

Table 12-4. Age-Adjusted Death Rates for the 10 Leading Causes of Death, by Sex and Race: 1976 and 1970

(Refers only to resident deaths occurring within the United States. Excludes fetal deaths. Based on age-specific death rates per 100,000 estimated midyear population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940. Leading causes of death are for the total population as of 1976)

Sex and cause of death	1976			1970		
	Black and other races	White	Ratio: Black and other races/White	Black and other races	White	Ratio: Black and other races/White
WOMEN						
All causes.....	635.1	439.6	1.44	770.8	501.7	1.54
Diseases of the heart.....	190.3	141.7	1.34	236.6	167.8	1.41
Malignant neoplasms.....	119.3	108.2	1.10	117.6	107.6	1.09
Cerebrovascular diseases.....	72.0	44.5	1.62	101.4	56.2	1.80
Accidents.....	25.8	22.2	1.16	35.1	27.2	1.29
Motor vehicle accidents.....	10.2	11.5	0.89	14.3	14.4	0.99
All other accidents.....	15.6	10.7	1.46	20.7	12.8	1.62
Influenza and pneumonia.....	17.0	12.6	1.35	27.9	15.0	1.86
Diabetes mellitus.....	23.7	9.7	2.44	29.3	12.8	2.29
Cirrhosis of the liver.....	15.4	7.7	2.00	17.4	8.7	2.00
Arteriosclerosis.....	5.3	5.8	0.91	7.5	7.5	1.00
Suicide.....	3.5	7.0	0.50	3.3	7.2	0.46
Certain causes of mortality in early infancy.....	20.6	9.1	2.26	26.5	14.2	1.87
MEN						
All causes.....	1,072.1	798.8	1.34	1,231.4	893.4	1.38
Diseases of the heart.....	302.8	303.0	1.00	350.8	347.6	1.01
Malignant neoplasms.....	202.3	159.1	1.27	185.3	154.3	1.20
Cerebrovascular diseases.....	84.6	53.7	1.58	113.5	68.8	1.65
Accidents.....	84.6	62.3	1.36	115.7	76.2	1.52
Motor vehicle accidents.....	35.3	31.8	1.11	49.7	40.1	1.24
All other accidents.....	49.3	30.5	1.62	66.0	36.2	1.82
Influenza and pneumonia.....	33.7	21.8	1.55	50.1	26.0	1.93
Diabetes mellitus.....	17.5	10.2	1.72	20.4	12.7	1.61
Cirrhosis of the liver.....	32.3	17.5	1.85	31.3	18.8	1.66
Arteriosclerosis.....	6.2	7.4	0.84	9.1	9.6	0.95
Suicide.....	12.3	19.2	0.64	10.3	18.2	0.57
Certain causes of mortality in early infancy.....	25.1	11.8	2.13	34.8	19.4	1.79

Source: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Monthly Vital Statistics Report, Vol. 26, No. 12; and Vital Statistics of the United States, 1970, Vol. II, Mortality.

Table 12-5. Marital Status of Women, by Race: 1978, 1975, and 1970

(Numbers in thousands. Noninstitutional population 14 years and over excluding members of the Armed Forces living in barracks for 1978 and 1975; total population excluding members of the Armed Forces living in barracks for 1970)

Marital status	Black			White		
	1978	1975 ^r	1970	1978	1975 ^r	1970
Total, 14 years and over.....	9,684	9,047	8,108	76,194	73,312	68,888
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
Never married.....	35.4	31.4	27.7	22.4	21.6	21.3
Married, husband present.....	33.4	36.9	42.0	57.5	59.4	60.3
Married, husband absent.....	11.0	12.0	12.0	2.7	2.6	2.5
Separated.....	9.6	10.6	10.0	1.9	1.9	1.3
Other.....	1.4	1.4	2.0	0.8	0.6	1.2
Widowed.....	12.0	13.1	13.8	11.6	11.9	12.4
Divorced.....	8.2	6.6	4.4	5.8	4.6	3.4

^rRevised.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 338; and unpublished 1975 and 1970 Current Population Survey data.

**Table 12-6. Selected Characteristics of Families With Female Householder, No Husband Present, by Race:
1978, 1975, and 1970**

(Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks for 1978 and 1975; total population excluding members of the Armed Forces living in barracks for 1970)

Characteristic	Black			White		
	1978	1975 ^r	1970	1978	1975 ^r	1970
Total families with female householder, no husband present.....	2,277	1,934	1,382	5,828	5,208	4,165
Percent of all families.....	39.2	35.2	28.3	11.5	10.5	9.0
AGE OF HOUSEHOLDER						
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
14 to 34 years.....	43.4	42.4	35.2	31.1	28.9	20.8
35 to 64 years.....	47.2	47.9	53.0	53.0	53.7	56.2
65 years and over.....	9.4	9.7	11.9	16.0	17.4	23.0
MARITAL STATUS						
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
Never married.....	28.4	21.7	16.0	10.7	9.3	9.2
Married, husband absent.....	29.3	35.0	39.6	18.7	19.0	18.4
Separated.....	26.3	31.4	33.9	14.9	14.9	11.3
Husband absent in Armed Forces.....	0.7	0.9	2.2	0.6	0.9	2.5
Other.....	2.3	2.7	3.5	3.1	3.1	4.6
Widowed.....	20.9	24.1	30.2	32.0	38.8	47.1
Divorced.....	21.3	19.2	14.2	38.6	32.9	25.3
PRESENCE OF OWN CHILDREN UNDER 18 YEARS						
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
With own children.....	72.1	71.2	66.0	59.8	57.1	47.9
With no own children.....	27.9	28.7	34.0	40.2	42.9	52.1
Number with own children.....	1,641	1,378	912	3,485	2,972	1,995
Percent with 2 or more own children....	45.8	47.5	47.1	31.7	31.8	29.2
Mean number of own children per family.....	1.59	1.73	1.83	1.07	1.10	0.99

^rRevised.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 340; and unpublished 1975 and 1970 Current Population Survey data.

Table 12-7. Children Ever Born Per 1,000 Women, by Marital Status, Age, and Race: 1978, 1976, and 1970

(Civilian noninstitutional population for 1978 and 1976; resident population for 1970. For meaning of symbols, see text)

Marital status and age of woman	Black			White		
	1978	1976	1970	1978	1976	1970
CHILDREN EVER BORN PER 1,000 TOTAL WOMEN						
Total, 18 to 44 years.....	2,034	2,051	2,415	1,519	1,593	1,848
18 and 19 years.....	365	401	477	144	143	163
20 to 24 years.....	932	1,005	1,205	502	519	674
25 to 29 years.....	1,709	1,769	2,274	1,191	1,311	1,732
30 to 34 years.....	2,370	2,572	3,196	1,943	2,116	2,569
35 to 39 years.....	3,511	3,492	3,639	2,564	2,722	2,934
40 to 44 years.....	4,040	3,694	3,649	2,952	3,013	2,864
CHILDREN EVER BORN PER 1,000 WOMEN EVER MARRIED						
Total, 15 to 44 years.....	2,805	2,676	2,974	1,952	2,017	2,281
15 to 17 years.....	(B)	(B)	871	598	363	530
18 and 19 years.....	(B)	(B)	1,088	518	535	587
20 to 24 years.....	1,445	1,444	1,627	857	835	998
25 to 29 years.....	1,969	1,946	2,536	1,390	1,498	1,918
30 to 34 years.....	2,629	2,753	3,390	2,078	2,248	2,733
35 to 39 years.....	3,680	3,600	3,822	2,681	2,853	3,086
40 to 44 years.....	4,290	3,858	3,817	3,062	3,110	3,077
CHILDREN EVER BORN PER 1,000 NEVER-MARRIED WOMEN						
Total, 18 to 44 years.....	841	856	850	94	73	98
18 and 19 years.....	317	296	302	46	27	32
20 to 24 years.....	662	675	658	72	64	77
25 to 29 years.....	1,223	1,296	1,306	134	109	208
30 to 34 years.....	1,378	1,600	1,871	286	151	263
35 to 39 years.....	2,051	(B)	1,939	223	255	271
40 to 44 years.....	2,000	(B)	1,659	288	284	236

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 308; and unpublished 1978 Current Population Survey data.

Table 12-8. Births to Date and Lifetime Births Expected Per 1,000 Wives 18 to 34 Years Old, by Age and Race: 1978, 1975, and 1971

(Data restricted to currently married women reporting on birth expectations. Civilian noninstitutional population)

Age and birth expectations	Black			White		
	1978	1975	1971	1978	1975	1971
18 TO 24 YEARS OLD						
Number of wives.....(thousands)..	332	350	427	4,103	4,334	4,523
Births to date.....	1,337	1,371	1,370	789	774	910
Lifetime births expected.....	2,460	2,489	2,623	2,139	2,147	2,353
25 TO 29 YEARS OLD						
Number of wives.....(thousands)..	346	392	330	4,684	4,673	4,139
Births to date.....	2,043	2,023	2,521	1,454	1,574	1,909
Lifetime births expected.....	2,604	2,587	3,112	2,188	2,233	2,577
30 TO 34 YEARS OLD						
Number of wives.....(thousands)..	369	339	276	4,798	4,263	3,652
Births to date.....	2,528	2,950	3,467	2,183	2,391	2,755
Lifetime births expected.....	2,787	3,212	3,714	2,395	2,564	2,936

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, Nos. 341 and 301.

Table 12-9 College Enrollment of Persons 14 to 34 Years Old, by Sex and Race: 1978, 1975, and 1970

(Numbers in thousands. Civilian noninstitutional population. For meaning of symbols, see text)

College enrollment and year	Women			Men		
	Black	White	Ratio: Black/ White	Black	White	Ratio: Black/ White
TOTAL, 14 TO 34 YEARS OLD						
1978.....	5,063	33,522	0.15	4,302	32,830	0.13
1975.....	4,695	32,164	0.15	4,022	31,298	0.13
1970.....	3,921	28,391	0.14	3,410	26,425	0.13
ENROLLED IN COLLEGE						
1978.....	569	4,006	0.14	452	4,508	0.10
1975.....	506	3,743	0.14	442	4,774	0.09
1970.....	269	2,693	0.10	253	4,066	0.06
PERCENT ENROLLED IN COLLEGE						
1978.....	11.2	12.0	(X)	10.5	13.7	(X)
1975.....	10.8	11.6	(X)	11.0	15.3	(X)
1970.....	6.9	9.5	(X)	7.4	15.4	(X)
Percent change in number enrolled, 1970-78.....	111.5	48.8	(X)	78.7	10.9	(X)

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, Nos. 335, 303, and 222.

Table 12-10. Years of School Completed by Persons 25 to 29 Years Old, by Sex and Race: 1978, 1975, and 1970

(Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks for 1978 and 1975; total population excluding members of the Armed Forces living in barracks for 1970)

Years of school completed and race	Women			Men		
	1978	1975 ^r	1970	1978	1975 ^r	1970
All races, 25 to 29 years old ¹	8,953	8,345	6,854	8,650	8,053	6,659
Black.....	1,080	936	751	857	758	701
White.....	7,663	7,238	6,013	7,591	7,152	5,880
Percent completing--						
0 to 8 years elementary school:						
Black.....	4.0	7.1	9.7	6.5	8.3	15.8
White.....	4.3	5.1	6.1	4.3	5.7	8.1
1 to 3 years high school:						
Black.....	19.7	23.1	32.5	14.8	19.4	29.5
White.....	9.9	11.6	17.5	8.9	8.5	12.7
4 years high school:						
Black.....	42.4	44.1	39.1	42.8	42.5	38.8
White.....	43.1	46.2	49.0	34.0	36.9	40.9
1 to 3 years college:						
Black.....	21.3	15.8	10.8	25.0	18.6	9.0
White.....	21.4	17.6	14.1	25.2	22.6	17.0
4 or more years college:						
Black.....	12.6	10.1	8.0	10.7	11.2	6.7
White.....	21.4	19.5	13.3	27.6	26.3	21.3

^rRevised.

¹Includes other races, not shown separately.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 207; and unpublished 1978 and 1975 Current Population Survey data.

Table 12-11. Percent of Women 20 Years Old and Over Who Completed High School and College, by Age and Race: 1978, 1975, and 1970

(Noninstitutional population excluding members of the Armed Forces living in barracks for 1978 and 1975; total population excluding members of the Armed Forces living in barracks for 1970)

Level of school completed and age	Black			White		
	1978	1975 ^r	1970	1978	1975 ^r	1970
Percent high school graduates:						
20 to 24 years.....	74.5	73.4	67.5	85.6	85.1	82.7
25 to 29 years.....	76.3	70.0	57.9	85.8	83.3	76.4
30 to 34 years.....	67.9	66.6	56.0	82.4	78.6	74.1
35 to 44 years.....	56.4	50.6	43.5	76.5	73.8	67.5
45 to 64 years.....	34.7	32.6	23.6	65.5	62.4	56.3
65 years and over.....	16.1	12.8	10.0	41.4	38.7	31.7
Percent college graduates:						
20 to 24 years.....	5.0	7.2	3.6	9.7	10.8	8.9
25 to 29 years.....	12.5	10.1	8.0	21.4	19.5	13.3
30 to 34 years.....	9.2	9.2	4.6	19.9	16.6	11.2
35 to 44 years.....	6.9	7.2	4.3	13.8	11.7	9.2
45 to 64 years.....	5.9	4.6	4.0	9.2	8.2	7.7
65 years and over.....	2.7	2.2	2.0	7.4	6.7	5.5

^rRevised.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 207; and unpublished 1978 and 1975 Current Population Survey data.

Table 12-12. Civilian Labor Force Participation Rates, by Age, Race, and Sex: Annual Averages for 1978 and 1970

(Number in civilian labor force as percent of population in specific group. Civilian noninstitutional population 16 years and over. For meaning of symbols, see text)

Race and age	1978			1970			Percentage-point change, 1970-78 ¹	
	Women	Men	Ratio: women/ men	Women	Men	Ratio: women/ men	Women	Men
BLACK AND OTHER RACES								
16 years and over.....	53.3	72.1	0.74	49.5	76.5	0.65	3.8	-4.4
16 to 19 years.....	38.1	45.4	0.84	34.1	47.2	0.72	4.0	-1.8
20 to 24 years.....	62.8	78.0	0.81	57.7	83.5	0.69	5.1	-5.5
25 to 34 years.....	68.7	90.9	0.76	57.6	93.7	0.61	11.1	-2.8
35 to 44 years.....	67.1	91.0	0.74	59.9	92.2	0.65	7.2	-1.2
45 to 54 years.....	59.8	84.5	0.71	60.2	88.2	0.68	-0.4	-3.7
55 to 64 years.....	43.6	69.1	0.63	47.1	79.2	0.59	-3.5	-10.1
65 years and over.....	10.7	21.3	0.50	12.2	27.4	0.45	-1.5	-6.1
WHITE								
16 years and over.....	49.5	78.6	0.63	42.6	80.0	0.53	6.9	-1.4
16 to 19 years.....	56.9	65.1	0.87	45.6	57.5	0.79	11.3	7.6
20 to 24 years.....	69.3	87.2	0.79	57.7	83.3	0.69	11.6	3.9
25 to 34 years.....	61.0	96.0	0.64	43.2	96.7	0.45	17.8	-0.7
35 to 44 years.....	60.7	96.3	0.63	49.9	97.3	0.51	10.8	-1.0
45 to 54 years.....	56.7	92.1	0.62	53.7	94.9	0.57	3.0	-2.8
55 to 64 years.....	41.2	73.9	0.56	42.6	83.3	0.51	-1.4	-9.4
65 years and over.....	8.1	20.4	0.40	9.5	26.7	0.36	-1.4	-6.3
RATIO: BLACK AND OTHER RACES/WHITE								
16 years and over.....	1.08	0.92	(X)	1.16	0.96	(X)	(X)	(X)
16 to 19 years.....	0.67	0.70	(X)	0.75	0.82	(X)	(X)	(X)
20 to 24 years.....	0.91	0.89	(X)	1.00	1.00	(X)	(X)	(X)
25 to 34 years.....	1.13	0.95	(X)	1.33	0.97	(X)	(X)	(X)
35 to 44 years.....	1.11	0.94	(X)	1.20	0.95	(X)	(X)	(X)
45 to 54 years.....	1.05	0.92	(X)	1.12	0.93	(X)	(X)	(X)
55 to 64 years.....	1.06	0.94	(X)	1.11	0.95	(X)	(X)	(X)
65 years and over.....	1.32	1.04	(X)	1.28	1.03	(X)	(X)	(X)

¹Differences between civilian labor force participation rates.Source: U.S. Department of Labor, Employment and Training Administration, and U.S. Department of Health, Education, and Welfare, Office of Human Development, 1978 Employment and Training Report of the President; and U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 26, No. 1.

Table 12-13. Labor Force Participation Rates for Married Women With Husband Present, by Presence and Age of Own Children and Race: 1978, 1975, and 1970

(Numbers in thousands. Number in labor force as percent of population in specific group. Civilian noninstitutional population 16 years and over for 1978 and 1975; civilian population 16 years and over for 1970. For meaning of symbols, see text)

Race and presence and age of children	1978	1975 ^r	1970	Percentage-point change, 1970-78
BLACK AND OTHER RACES				
Total married women, husband present.....	4,107	4,086	3,783	(X)
Participation rate.....	57.4	53.0	52.5	4.9
No own children under 18 years.....	49.0	48.0	50.9	-1.9
With own children under 18 years.....	62.9	56.1	53.4	9.5
Children 6 to 17 years only.....	67.3	61.0	62.6	4.7
Children under 6 years.....	58.1	51.8	46.9	11.2
WHITE				
Total married women, husband present.....	43,799	43,537	41,272	(X)
Participation rate.....	46.6	43.6	39.7	6.9
No own children under 18 years.....	44.4	43.6	41.5	2.9
With own children under 18 years.....	48.8	43.6	38.3	10.5
Children 6 to 17 years only.....	56.1	51.5	48.0	8.1
Children under 6 years.....	39.7	34.7	28.4	11.3
RATIO: BLACK AND OTHER RACES/WHITE				
Total married women, husband present.....	1.23	1.22	1.32	(X)
No own children under 18 years.....	1.10	1.10	1.23	(X)
With own children under 18 years.....	1.29	1.29	1.39	(X)
Children 6 to 17 years only.....	1.20	1.18	1.30	(X)
Children under 6 years.....	1.46	1.49	1.65	(X)

^r Revised.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, No. 130; and U.S. Department of Commerce, Bureau of the Census, unpublished 1978 and 1975 Current Population Survey data.

Table 12-14. Employment Status of Women, by Marital Status and Race: 1978

(Numbers in thousands. Civilian noninstitutional population 16 years and over)

Race and marital status	Civilian noninsti- tutional population	Civilian labor force				
		Number	Percent of civilian noninsti- tutional population	Employed	Unemployed	
					Number	Percent of civilian labor force
BLACK						
Total women, 16 years and over...	9,102	4,748	52.2	4,103	645	13.6
Never married.....	2,842	1,420	49.9	1,087	333	23.4
Married, husband present.....	3,233	1,885	58.3	1,732	153	8.1
Married, husband absent.....	1,066	599	56.2	510	89	14.8
Widowed.....	1,166	317	27.2	289	28	8.8
Divorced.....	795	527	66.3	484	43	8.1
WHITE						
Total women, 16 years and over...	72,824	35,415	48.6	33,276	2,139	6.0
Never married.....	13,740	8,612	62.7	7,843	769	8.9
Married, husband present.....	43,799	20,432	46.6	19,452	980	4.8
Married, husband absent.....	2,056	1,168	56.8	1,066	101	8.7
Widowed.....	8,848	1,912	21.6	1,831	82	4.3
Divorced.....	4,381	3,291	75.1	3,084	207	6.3

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

**Table 12-15. Civilian Labor Force, Number Unemployed, and Unemployment Rates, by Age, Race, and Sex:
Annual Averages for 1978, 1975, and 1970**

(Numbers in thousands. Civilian noninstitutional population 16 years and over)

Age and sex	Black and other races			White		
	1978	1975	1970	1978	1975	1970
CIVILIAN LABOR FORCE						
Total, 16 years and over.....	11,963	10,529	9,197	88,456	82,084	73,518
Women.....	5,679	4,795	4,015	36,198	32,203	27,505
Men.....	6,284	5,734	5,182	52,258	49,881	46,013
16 and 17 years.....	398	356	309	3,652	3,335	2,822
Women.....	182	167	129	1,683	1,484	1,194
Men.....	216	189	180	1,969	1,851	1,628
18 and 19 years.....	652	584	497	4,837	4,523	3,617
Women.....	315	277	222	2,281	2,110	1,695
Men.....	337	307	275	2,556	2,413	1,922
20 years and over.....	10,913	9,589	8,390	79,966	74,226	68,079
Women.....	5,182	4,351	3,664	32,233	28,609	24,616
Men.....	5,731	5,238	4,726	47,733	45,617	42,463
NUMBER UNEMPLOYED						
Total, 16 years and over.....	1,427	1,458	752	4,620	6,371	3,336
Women.....	741	671	373	2,255	2,774	1,480
Men.....	686	787	379	2,365	3,597	1,856
Ratio: women/men.....	1.08	0.85	0.98	0.95	0.77	0.80
16 and 17 years.....	163	139	98	619	650	438
Women.....	76	65	48	287	285	183
Men.....	87	74	50	332	365	255
Ratio: women/men.....	0.87	0.88	0.96	0.86	0.78	0.72
18 and 19 years.....	219	207	137	559	756	432
Women.....	115	106	73	282	340	202
Men.....	104	101	64	277	416	230
Ratio: women/men.....	1.11	1.05	1.14	1.02	0.82	0.88
20 years and over.....	1,045	1,112	517	3,443	4,965	2,466
Women.....	550	500	252	1,686	2,149	1,095
Men.....	495	612	265	1,757	2,816	1,371
Ratio: women/men.....	1.11	0.82	0.95	0.96	0.76	0.80
UNEMPLOYMENT RATE						
Total, 16 years and over.....	11.9	13.8	8.2	5.2	7.8	4.5
Women.....	13.1	14.0	9.3	6.2	8.6	5.4
Men.....	10.9	13.7	7.3	4.5	7.2	4.0
Ratio: women/men ¹	1.20	1.02	1.27	1.38	1.19	1.35
16 and 17 years.....	41.0	39.0	31.7	16.9	19.5	15.5
Women.....	41.7	38.9	36.9	17.1	19.2	15.3
Men.....	40.0	39.4	27.8	16.9	19.7	15.7
Ratio: women/men ¹	1.04	0.99	1.33	1.01	0.97	0.97
18 and 19 years.....	33.6	35.4	27.6	11.6	16.7	11.9
Women.....	36.5	38.3	32.9	12.4	16.1	11.9
Men.....	30.8	32.9	23.1	10.8	17.2	12.0
Ratio: women/men ¹	1.19	1.16	1.42	1.15	0.94	0.99
20 years and over.....	9.6	11.6	6.2	4.3	6.7	3.7
Women.....	10.6	11.5	6.9	5.2	7.5	4.4
Men.....	8.6	11.1	5.6	3.7	6.2	3.2
Ratio: women/men ¹	1.23	1.04	1.23	1.41	1.21	1.38

¹Ratios of unemployment rates.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 26, No. 1; Vol. 22, No. 7; and Vol. 17, No. 7.

Table 12-16. Annual Work Experience, by Sex and Race: 1977, 1975, and 1970

(Numbers in thousands. Persons as of the following year. Civilian noninstitutional population 16 years and over. For meaning of symbols, see text)

Work experience and sex	Black and other races				White			
	1977	1975	1970	Percent change, 1970-77	1977	1975	1970	Percent change, 1970-77
Persons 16 years old and over:								
Women.....	10,550	9,976	8,275	27.5	72,824	70,858	65,382	11.4
Men.....	8,639	8,219	6,908	25.1	66,175	64,127	58,388	13.3
Number worked during year:								
Women.....	5,812	5,417	4,778	21.6	40,567	37,463	33,926	19.6
Men.....	6,293	5,878	5,487	14.7	54,424	52,481	49,432	10.1
Ratio: women/men.....	0.92	0.92	0.87	(X)	0.74	0.71	0.69	(X)
Percent worked during year:								
Women.....	55.1	54.3	57.7	-4.5	55.7	52.9	51.9	7.3
Men.....	72.8	71.5	79.4	-8.3	82.2	81.8	84.7	-3.0
Ratio: women/men.....	0.76	0.76	0.73	(X)	0.68	0.65	0.61	(X)
Percent of workers who worked 50 to 52 weeks at full-time ¹ jobs:								
Women.....	46.0	43.6	41.5	10.8	41.6	41.0	40.5	2.7
Men.....	58.7	56.5	59.3	-1.0	65.4	64.7	66.8	-2.1
Ratio: women/men.....	0.78	0.77	0.70	(X)	0.64	0.63	0.61	(X)
Percent of workers who worked at part-time jobs: ²								
Women.....	26.7	27.9	29.6	-9.8	33.9	33.7	32.5	4.3
Men.....	15.2	14.5	14.3	6.3	12.2	12.2	12.2	-
Ratio: women/men.....	1.76	1.92	2.07	(X)	2.78	2.76	2.66	(X)

¹Full-time jobs are defined as 35 hours or more per week in a majority of the weeks worked.

²Part-time jobs are defined as 1 to 34 hours per week in a majority of the weeks worked.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, Nos. 224, 192, and 141.

Table 12-17. Employment Status and Major Occupation Group, by Sex and Race: Annual Averages for 1978, 1975, and 1970

(Numbers in thousands. Civilian noninstitutional population 16 years and over. For meaning of symbols, see text)

Sex, employment status, and occupation	Black and other races			White		
	1978	1975	1970	1978	1975	1970
WOMEN						
In civilian labor force.....	5,679	4,795	4,015	36,198	32,203	27,505
Percent unemployed.....	13.1	14.0	9.3	6.2	8.6	5.4
Employed.....	4,938	4,124	3,642	33,943	29,429	26,025
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
White-collar workers.....	47.1	44.1	36.0	65.5	65.5	63.9
Professional, technical, and kindred workers.	13.8	13.3	10.8	15.9	16.0	15.0
Managers and administrators, except farm.....	2.9	2.6	1.9	6.5	5.5	4.8
Sales workers.....	3.1	3.0	2.5	7.4	7.5	7.7
Clerical and kindred workers.....	27.2	25.1	20.8	35.7	36.5	36.4
Blue-collar workers.....	18.6	17.8	19.2	14.3	13.6	15.7
Craft and kindred workers.....	1.3	1.3	0.8	1.9	1.5	1.2
Operatives, except transport.....	15.3	14.9	17.6	10.5	10.5	14.1
Transport equipment operatives.....	0.5	0.5	0.7	0.7	0.6	0.4
Laborers, except farm.....	1.4	1.1	0.7	1.2	1.1	0.4
Farm workers.....	0.9	1.0	1.7	1.4	1.4	1.8
Service workers.....	33.4	37.1	43.1	18.8	19.5	18.7
Private household.....	7.7	10.6	17.5	2.2	2.4	3.4
Other.....	25.8	26.6	25.6	16.6	17.1	15.3
MEN						
In civilian labor force.....	6,284	5,734	5,182	52,258	49,881	46,013
Percent unemployed.....	10.9	13.7	7.3	4.5	7.2	4.0
Employed.....	5,599	4,947	4,803	49,893	46,284	44,157
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0
White-collar workers.....	26.7	26.0	21.7	42.4	42.9	43.1
Professional, technical, and kindred workers.	9.8	9.9	7.8	15.3	15.1	14.6
Managers and administrators, except farm.....	6.5	5.9	4.7	14.8	14.8	15.3
Sales workers.....	2.6	2.4	1.8	6.3	6.5	6.1
Clerical and kindred workers.....	7.8	7.9	7.4	6.0	6.4	7.1
Blue-collar workers.....	53.6	53.8	59.6	45.6	44.4	45.6
Craft and kindred workers.....	15.4	15.0	13.8	21.7	21.0	20.8
Operatives, except transport.....	15.7	15.1	28.4	11.4	11.2	18.7
Transport equipment operatives.....	8.9	8.7	17.5	5.6	5.6	6.2
Laborers, except farm.....	13.6	14.9	17.5	7.0	6.6	6.2
Farm workers.....	3.9	3.9	5.6	4.2	4.9	5.1
Service workers.....	15.9	16.3	13.1	7.8	7.8	6.0
Private household.....	0.1	0.1	0.3	-	-	0.3
Other.....	15.8	16.2	12.8	7.8	7.7	6.0

Note: Occupational data for 1978 and 1975 are not strictly comparable with statistics for 1970 as a result of changes in the occupational classification system for the 1970 Census of Population that were introduced in January 1971, and the addition of a question to the CPS in December 1971 relating to major activities and duties. For an explanation of these changes, see Bureau of the Census, Technical Paper No. 26.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 26, No. 1; Vol. 22, No. 7; and Vol. 17, No. 7.

Table 12-18. Median Income and Median Earnings of Persons With Income or Earnings, by Work Experience, Sex, and Race: 1970 to 1977

(In 1977 dollars. Numbers in thousands. Persons 14 years and over as of the following year. Noninstitutional population excluding members of the Armed Forces living in barracks)

Race and year	Women				Men			
	Total		Year-round full-time workers		Total		Year-round full-time workers	
	Number	Median (dollars)	Number	Median (dollars)	Number	Median (dollars)	Number	Median (dollars)
MEDIAN INCOME								
Black								
1977.....	7,562	\$3,455	2,296	\$8,290	6,656	\$6,215	3,082	\$10,602
1976.....	7,188	3,617	2,138	8,336	6,528	6,256	2,953	10,881
1975.....	6,969	3,498	2,036	8,323	6,404	6,193	2,770	11,088
1970.....	5,844	3,220	1,786	7,079	5,752	6,428	2,878	10,043
Percent change: 1970-77...	29.4	7.3	28.6	17.1	15.7	-3.3	7.1	5.6
White								
1977.....	56,813	\$4,001	16,610	\$8,870	65,254	\$10,607	35,591	\$15,378
1976.....	55,026	3,839	15,669	8,916	64,144	10,594	34,681	15,193
1975.....	52,936	3,851	15,126	8,711	62,823	10,487	33,960	14,899
1970.....	45,288	3,536	13,551	8,640	57,386	10,959	32,910	14,743
Percent change: 1970-77...	25.4	13.2	22.6	2.7	13.7	-3.2	8.1	4.3
Ratio: Black/White								
1977.....	0.13	0.86	0.14	0.93	0.10	0.59	0.09	0.69
1976.....	0.13	0.94	0.14	0.93	0.10	0.59	0.09	0.72
1975.....	0.13	0.91	0.13	0.96	0.10	0.59	0.08	0.74
1970.....	0.13	0.91	0.13	0.82	0.10	0.59	0.09	0.68
MEDIAN EARNINGS								
Black								
1977.....	4,993	\$4,830	2,296	\$8,097	5,367	\$7,395	3,082	\$10,445
1976.....	4,746	4,835	2,136	8,144	5,300	7,507	2,953	10,764
1975.....	4,698	4,313	2,036	8,148	5,075	7,478	2,770	10,929
1970.....	4,353	3,639	1,783	6,940	5,054	7,121	2,878	9,938
Percent change: 1970-77...	14.7	32.7	28.8	16.7	6.2	3.8	7.1	5.1
White								
1977.....	40,709	\$4,611	16,570	\$8,672	55,655	\$11,463	35,571	\$15,060
1976.....	39,407	4,498	15,631	8,680	54,645	11,317	34,670	14,704
1975.....	37,845	4,400	15,099	8,459	53,680	11,267	33,949	14,466
1970.....	33,745	4,312	13,513	8,446	50,710	11,536	32,896	14,394
Percent change: 1970-77...	20.6	6.9	22.6	2.7	9.8	-0.6	8.1	4.6
Ratio: Black/White								
1977.....	0.12	1.05	0.14	0.93	0.10	0.65	0.09	0.69
1976.....	0.12	1.07	0.14	0.94	0.10	0.66	0.09	0.73
1975.....	0.12	0.98	0.13	0.96	0.09	0.66	0.08	0.76
1970.....	0.13	0.84	0.13	0.82	0.10	0.62	0.09	0.69

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, Nos. 118, 114, 105, and 80.

Table 12-19. Median Income, by Work Experience, Sex, and Race: 1977 and 1970

(In 1977 dollars. Numbers in thousands. Persons 14 years and over as of the following year. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text.)

Race, sex, and work experience	1977		1970		Percent change, 1970-77	
	Number	Median income	Number	Median income	Number	Median income
BLACK						
Women						
Total with income.....	7,562	\$3,455	5,844	\$3,220	29.4	7.3
Worked last year.....	4,986	5,275	4,345	4,134	14.8	27.6
50 to 52 weeks.....	2,749	7,483	2,201	6,171	24.9	21.3
Full-time jobs ¹	2,296	8,290	1,786	7,079	28.6	17.1
Part-time jobs ²	453	3,242	415	2,558	9.2	26.7
1 to 49 weeks.....	2,236	2,612	2,144	2,255	4.3	15.8
Did not work.....	2,576	2,267	1,498	2,002	72.0	13.2
Men						
Total with income.....	6,656	\$6,215	5,752	\$6,428	15.7	3.3
Worked last year.....	5,323	7,688	4,991	7,402	6.7	3.9
50 to 52 weeks.....	3,308	10,239	3,076	9,621	7.5	6.4
Full-time jobs ¹	3,082	10,602	2,878	10,043	7.1	5.6
Part-time jobs ²	226	3,869	198	2,519	14.1	53.6
1 to 49 weeks.....	2,015	3,507	1,915	3,383	5.2	3.7
Did not work.....	1,333	2,803	761	2,403	75.2	16.6
Ratio: Women/Men						
Total with income.....	1.14	0.56	1.02	0.50	(X)	(X)
Worked last year.....	0.94	0.69	0.87	0.56	(X)	(X)
50 to 52 weeks.....	0.83	0.73	0.72	0.64	(X)	(X)
Full-time jobs ¹	0.74	0.78	0.62	0.70	(X)	(X)
Part-time jobs ²	2.00	0.84	2.10	1.02	(X)	(X)
1 to 49 weeks.....	1.11	0.74	1.12	0.67	(X)	(X)
Did not work.....	1.93	0.81	1.97	0.83	(X)	(X)
WHITE						
Women						
Total with income.....	56,813	\$4,001	45,288	\$3,536	25.4	13.2
Worked last year.....	40,551	5,214	33,700	4,864	20.3	7.2
50 to 52 weeks.....	21,051	7,994	16,629	7,789	26.6	2.7
Full-time jobs ¹	16,610	8,870	13,551	8,640	22.6	2.7
Part-time jobs ²	4,441	3,767	3,078	3,243	44.3	16.2
1 to 49 weeks.....	19,499	2,411	17,071	2,073	14.2	16.4
Did not work.....	16,263	2,645	11,588	2,071	40.3	27.7
Men						
Total with income.....	65,254	\$10,607	57,386	\$10,959	13.7	3.2
Worked last year.....	55,389	12,148	50,332	12,037	10.0	0.9
50 to 52 weeks.....	37,989	15,008	35,305	14,230	7.6	7.3
Full-time jobs ¹	35,591	15,378	32,910	14,743	8.1	4.3
Part-time jobs ²	2,398	3,749	2,395	3,646	0.1	2.8
1 to 49 weeks.....	17,400	5,018	15,027	5,345	15.8	5.4
Did not work.....	9,866	4,713	7,054	3,802	39.9	24.0
Ratio: Women/Men						
Total with income.....	0.87	0.38	0.79	0.32	(X)	(X)
Worked last year.....	0.73	0.43	0.67	0.40	(X)	(X)
50 to 52 weeks.....	0.55	0.53	0.47	0.55	(X)	(X)
Full-time jobs ¹	0.47	0.58	0.41	0.59	(X)	(X)
Part-time jobs ²	1.85	1.00	1.29	0.89	(X)	(X)
1 to 49 weeks.....	1.12	0.48	1.14	0.39	(X)	(X)
Did not work.....	1.65	0.56	1.64	0.64	(X)	(X)

¹Full-time jobs are defined as 35 hours or more per week in a majority of the weeks worked.

²Part-time jobs are defined as 1 to 34 hours per week in a majority of the weeks worked.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, Nos. 118 and 80.

Table 12-20. Persons Below the Poverty Level, by Family Status, Sex of Householder, and Race: 1977 and 1970

(Numbers in thousands. Persons as of the following year. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Characteristic	Black			White		
	Total	Below poverty level		Total	Below poverty level	
		Number	Percent		Number	Percent
1977						
Persons in Families With Female Householder, No Husband Present						
Total.....	8,315	4,595	55.3	16,721	4,474	26.8
Householder, 14 years and over.....	2,277	1,162	51.0	5,828	1,400	24.0
Related children under 18 years.....	4,393	2,885	65.7	6,682	2,693	40.3
Related children under 6 years.....	1,361	997	73.3	1,496	868	58.0
Related children 6 to 17 years.....	3,032	1,888	62.3	5,186	1,826	35.2
Other family members.....	1,644	548	33.3	4,210	381	9.0
Persons in Families With Male Householder ¹						
Total.....	13,535	2,072	15.3	148,664	7,890	5.3
Householder, 14 years and over.....	3,529	475	13.5	44,701	2,140	4.8
Wife of householder.....	3,166	419	13.2	43,369	2,033	4.7
Related children under 18 years.....	4,859	965	19.9	45,618	3,250	7.1
Related children under 6 years.....	1,469	297	20.2	13,619	1,098	8.1
Related children 6 to 17 years.....	3,390	668	19.7	31,999	2,152	6.7
Other family members.....	1,981	214	10.8	14,976	468	3.1
Unrelated Individuals						
Total.....	2,860	1,059	37.0	19,869	4,051	20.4
Female.....	1,387	636	45.9	11,569	2,747	23.7
Male.....	1,473	423	28.7	8,300	1,305	15.7
1970						
Persons in Families With Female Householder, No Husband Present						
Total.....	6,225	3,656	58.7	13,226	3,761	28.4
Householder, 14 years and over.....	1,535	834	54.3	4,408	1,102	25.0
Related children under 18 years.....	3,518	2,383	67.7	5,216	2,247	43.1
Related children under 6 years.....	1,087	770	70.8	1,318	771	58.5
Related children 6 to 17 years.....	2,431	1,613	66.4	3,898	1,476	37.9
Other family members.....	1,172	439	37.5	3,601	413	11.5
Persons in Families With Male Householder ¹						
Total.....	14,499	3,030	20.9	150,649	9,562	6.3
Householder, 14 years and over.....	3,492	648	18.6	42,193	2,606	6.2
Wife of householder.....	(NA)	(NA)	(NA)	(NA)	(NA)	(NA)
Related children under 18 years.....	5,930	1,542	26.0	53,255	3,891	7.3
Related children under 6 years.....	1,924	497	25.8	16,162	1,303	8.1
Related children 6 to 17 years.....	4,006	1,045	26.1	37,093	2,588	7.0
Other family members ²	5,077	840	16.5	55,201	3,065	5.6
Unrelated Individuals						
Total.....	1,791	865	48.3	13,500	4,161	30.8
Female.....	945	560	59.3	8,496	3,070	36.1
Male.....	846	304	36.0	5,004	1,091	21.8

¹Includes householders with or without wife present.²Includes wife of householder.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, Nos. 119 and 116; and unpublished 1971 Current Population Survey data.

Table 12-21. Poverty Status of Families With Female Householder, No Husband Present, by Race: 1970 to 1977

(Numbers in thousands. Families as of the following year. Noninstitutional population excluding members of the Armed Forces living in barracks)

Year	Total Black families below poverty level	Black families with female householder, no husband present			
		Total families	Below poverty level		
			Number	Percent of total families	Percent of all Black families below poverty level
1977.....	1,637	2,277	1,162	51.0	71.0
1976.....	1,617	2,151	1,122	52.2	69.4
1975.....	1,513	2,004	1,004	50.1	66.4
1974 ^r	1,479	1,934	1,010	52.2	68.3
1973.....	1,527	1,849	974	52.7	63.8
1972.....	1,529	1,822	972	53.3	63.6
1971.....	1,484	1,642	879	53.5	59.2
1970.....	1,481	1,535	834	54.3	56.3
Year	Total White families below poverty level	White families with female householder, no husband present			
		Total families	Below poverty level		
			Number	Percent of total families	Percent of all White families below poverty level
1977.....	3,540	5,828	1,400	24.0	39.5
1976.....	3,560	5,467	1,379	25.2	38.7
1975.....	3,838	5,380	1,394	25.9	36.3
1974 ^r	3,352	5,208	1,289	24.8	38.5
1973.....	3,219	4,853	1,190	24.5	37.0
1972.....	3,441	4,672	1,135	24.3	33.0
1971.....	3,751	4,489	1,191	26.5	31.8
1970.....	3,708	4,408	1,102	25.0	29.7

^rRevised.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, Nos. 119, 116, 115, 106, 103, 99, 98, 91, and 82; and unpublished 1971 Current Population Survey data.

Table 12-22. Reported Registration and Voter Participation of Women, for Congressional and Presidential Elections, by Region and Race: 1968 to 1978

(Numbers in thousands. Civilian noninstitutional population of voting age)

Race and region	Congressional election			Presidential election		
	1978	1974	1970	1976	1972	1968
BLACK						
Total of Voting Age						
United States.....	8,679	7,852	6,328	8,266	7,459	6,031
South.....	4,549	4,070	3,348	4,359	3,780	3,255
North and West.....	4,130	3,782	2,980	3,907	3,679	2,776
Percent Who Reported They Registered						
United States.....	58.1	56.5	60.7	60.0	65.9	65.9
South.....	58.0	56.9	57.6	57.9	64.3	61.0
North and West.....	58.2	56.2	64.1	62.3	67.4	71.6
Percent Who Reported They Voted						
United States.....	37.8	34.1	42.2	49.9	52.2	57.1
South.....	35.1	30.2	35.5	46.8	47.8	50.9
North and West.....	40.7	38.2	49.8	53.5	56.6	64.4
WHITE						
Total of Voting Age						
United States.....	70,064	65,979	57,300	68,079	64,139	55,480
South.....	21,128	19,602	16,485	20,546	18,750	15,451
North and West.....	48,936	46,377	40,815	47,533	45,389	40,029
Percent Who Reported They Registered						
United States.....	63.7	62.8	67.7	67.8	72.6	73.9
South.....	60.3	59.1	62.1	65.4	68.1	67.7
North and West.....	65.2	64.4	70.0	68.9	74.5	76.2
Percent Who Reported They Voted						
United States.....	46.6	44.9	54.0	60.5	63.4	67.2
South.....	39.3	34.8	42.9	55.9	55.1	58.4
North and West.....	49.8	49.1	58.5	62.4	66.9	70.6

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, Nos. 344 and 322; and P-23, No. 58.

Table 12-23. Victimization Rates for Crimes Against Women, by Age and Race: 1977

(Numbers in thousands. Rate is number of victimizations per 1,000 persons 12 years and over. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Race and age	All women	Crimes of violence								Crimes of theft
		Total	Rape	Robbery			Assault			
				Total	With injury	Without injury	Total	Aggra- vated	Simple	
BLACK										
Total, 12 years and over.....	10,500	28.9	1.6	7.4	2.6	4.8	20.0	9.0	11.1	77.7
12 to 15 years.....	1,195	31.5	2.2	5.4	1.0	4.4	23.9	9.7	14.2	66.3
16 to 19 years.....	1,172	44.1	2.2	9.4	1.2	8.2	32.5	16.0	16.5	89.8
20 to 24 years.....	1,327	42.3	2.8	6.0	2.1	3.9	33.6	16.7	16.9	113.1
25 to 34 years.....	1,971	41.0	2.9	7.8	4.1	3.7	30.3	11.0	19.2	114.5
35 to 49 years.....	2,082	17.7	0.8	6.5	2.3	4.2	10.4	5.1	5.3	73.2
50 to 64 years.....	1,602	18.2	-	10.4	4.9	5.6	7.8	3.2	4.6	47.7
65 years and over.....	1,152	10.1	-	5.6	1.2	4.3	4.5	3.5	1.0	23.6
WHITE										
Total, 12 years and over.....	78,981	21.7	1.6	3.5	1.3	2.2	16.6	4.5	12.2	89.0
12 to 15 years.....	6,556	37.1	2.8	4.2	0.9	3.3	30.1	6.1	23.9	139.1
16 to 19 years.....	7,005	43.8	5.9	5.3	1.7	3.6	32.6	8.0	24.6	142.1
20 to 24 years.....	8,438	40.3	2.8	5.7	2.5	3.1	31.9	9.1	22.8	135.2
25 to 34 years.....	14,376	28.6	1.7	3.7	1.3	2.4	23.3	6.6	16.7	112.0
35 to 49 years.....	15,588	14.7	0.8	2.6	0.6	2.0	11.4	3.3	8.1	87.7
50 to 64 years.....	15,064	8.1	0.2	2.6	0.7	1.9	5.4	1.7	3.7	51.6
65 years and over.....	11,953	4.9	0.2	2.6	1.9	0.7	2.1	0.6	1.5	18.7

Source: U.S. Department of Justice, Law Enforcement Assistance Administration, unpublished 1977 National Crime Survey data.

Chapter 13

American Indian Women and Asian Women



The preceding chapters of this report have focused on the changing status of women during the 1970 decade. However, data on American Indian women and Asian women are limited, and the statistics and analysis of the status of these women in this chapter are confined to the 1970 census.

American Indian women. The social and economic position of American Indian women presents a picture considerably different from that of women in the overall population. The status of Indian women in most areas was significantly below that of all women; for example, Indian women in 1970 had less education, were more likely to be unemployed, and had lower incomes than women in the total population.

In 1970, there were 388,000 American Indian women enumerated in the United States (table 13-1). The sex ratio (number of males per 100 females) was 96.7, a figure slightly higher than the national ratio of 94.8. The majority of Indian women (55 percent) resided in rural areas of the United States. Twenty-eight percent of American Indian women lived on identified reservations in 1970.¹

Indian women were much younger, on the average, than women in the overall population; in 1970, the median age of Indian women was 20.9 years, as compared with 29.3 years for all women. The younger median age of Indian women reflects the higher fertility rate (see table 13-3) of this group, compared with women in the total population. Only 12 percent of Indian women were 55 years and over, compared with about 21 percent of all women.

American Indian women were more likely to be never married in 1970 than all women, reflecting the younger median age of this population group (table 13-3). They were also more likely to be separated or divorced, but less likely to be widowed, than all women.

The average number of children ever born to Indian women was higher than that for all women. In 1970, Indian women 25 to 34 years old averaged 3,255 children per 1,000 women ever married, as compared with 2,374 for all ever-married women in this age group. The average number of children ever born among Indian women 35 to 44 years

¹ U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. II, IF, *American Indians*. The Bureau of the Census, in conjunction with the Bureau of Indian Affairs, identified 115 reservations for tabulation purposes for the 1970 census.

old was 4,554 per 1,000 women ever married and 3,132 per 1,000 corresponding women in the total population.

Eighteen percent of Indian families in 1970 were maintained by a woman with no husband present, as compared with 11 percent of all families (table 13-4). Among these Indian families, 66 percent had children under 18 years and 32 percent had children under 6 years.

The educational levels of Indian women were substantially below those of all women in 1970 (table 13-5 and figure 13-1). Thirty-three percent of Indian women 25 years old and over were high school graduates (about the same proportion as Indian men), in contrast to 53 percent of all women. Only 3 percent of Indian women of this age group had completed 4 or more years of college, compared with 8 percent of women in the total population. Despite the relatively low educational attainment of Indian women overall, improvement in educational attainment was evident among the younger age groups; for example, 58 percent of Indian women 20 to 24 years old had completed high school (table 13-6).

In 1970, 35 percent of Indian women were in the labor force, compared with 41 percent of all women (table 13-7). Labor force participation rates varied considerably by age; for example, 45 percent of Indian women 20 to 24 years old, but only 37 percent of those 45 to 64 years old, were in the labor force (table 13-8 and figure 13-2). The unemployment rate for Indian women was twice as high as that for all women (10 percent versus 5 percent, respectively). However, the unemployment rate for Indian women was slightly lower in 1970 than the rate for Indian men (12 percent).

Indian women in 1970 were employed primarily in white-collar (mainly clerical) and service positions (table 13-9). The proportion of employed Indian women in white-collar occupations (43 percent), however, was much lower than that for all employed women (62 percent). In addition, 1 of every 3 Indian women, compared with 1 of every 5 women in the overall population, was employed in service occupations. In contrast, Indian men were most likely to be employed in blue-collar occupations.

The income level of Indian women was also lower than that of total women (table 13-10). In 1969, the median income for Indian women was \$1,650, or 71 percent of that for all women (\$2,330). Among Indian women, about 70 percent earned less than \$3,000, as compared with 58 percent for all women. Only 1 percent of Indian women, compared with 3 percent of all women, had incomes of \$10,000 or more in 1969.

Among Indian families maintained by a woman with no husband present in 1970, 47 percent had incomes under \$3,000 in 1969, as compared with 31 percent of such families in the total population (table 13-11). Fifty-six percent of all Indian families maintained by a woman were in poverty in 1969. This figure was about 1.7 times higher than the

corresponding proportion (32 percent) for all families with a female householder, no husband present.

Asian women. In this chapter, Asian women in the United States include Japanese, Chinese, and Filipino women—the three largest Asian groups identified in the 1970 census. As mentioned in the chapter note, the data on Asian women presented in this chapter are limited. Immigration has been, and continues to be, a major factor affecting the demographic characteristics of the Asian population; therefore, cross-tabulations by nativity, year of immigration, and age are necessary for a complete statistical portrait of Asian women. Such detailed cross-tabulations from the 1970 census are somewhat limited, and current census information reflecting the characteristics of immigrants since 1970 is not available.

The largest Asian group in 1970 was Japanese women, which numbered 317,000, followed by Chinese women with 205,000, and Filipino women at 154,000 (table 13-1). The sex ratios (number of males per 100 females), reflecting various immigration patterns, differed for each group with 85.7 for Japanese, 110.7 for Chinese, and 119.3 for Filipinos. (The national sex ratio was 94.8.) Asians who immigrated to the U.S. mainland in the early 1900's were primarily male laborers. In few instances (chiefly among Japanese workers) were men able to bring their wives. Because of these differential immigration patterns, males in the three Asian groups outnumbered their female counterparts in every census until 1960. In that census, Japanese women outnumbered Japanese men for the first time—a reflection of the number of Japanese women who married Americans during the occupation of Japan.² The War Brides Act of 1946 also increased immigration of Chinese women to the United States.³ More recently, the 1965 Immigration Act markedly increased the proportion of Asian women immigrating to the United States. In 1970, however, males still outnumbered females in the Chinese and Filipino populations.⁴

In 1970, Japanese women, with a median age of 34.1 years, were older than women in the total population, while Chinese and Filipino women, with median ages of 25.8 and 24.5 years, respectively, were younger than all women. About 8 percent of Japanese women were 65 years old and over, as compared with 6 percent of Chinese women and only 3 percent of Filipino women.

² U.S. Department of Health, Education, and Welfare, Office of Special Concerns, *A Study of Selected Socioeconomic Characteristics of Ethnic Minorities Based on the 1970 Census*, Volume Asian Americans, 1974.

³ U.S. Department of Labor, Manpower Administration, *Chinese American Manpower and Employment*, by Betty Lee Sung, 1975.

⁴ U.S. Department of Health, Education, and Welfare, Office of Special Concerns, op. cit.

Asian women were more urbanized in 1970 than women in the overall population. Among the subgroups of Asian women, 97 percent of Chinese women, 89 percent of Japanese women, and 88 percent of Filipino women lived in urban areas in 1970, as compared with 74 percent of all women.

In 1970, close to one-half of Chinese and Filipino women were foreign born; only about one-fourth of Japanese women were foreign born (table 13-2). Information from the Immigration and Naturalization Service indicates that immigration has been substantial since 1970, especially among the Chinese and Filipino groups.⁵

Chinese and Filipino women were much more likely to be ever married in 1970 than were all women in the population. The proportion was 31 percent for both Asian groups, compared with 23 percent for total women (table 13-3). The proportion never married among Japanese women in 1970 was about the same as that for all women.

The average number of children ever born to Japanese women and to Chinese women was considerably lower than that for all women in 1970. In contrast, Filipino women had higher rates of children ever born than the national average for women in the age groups 15 to 24 and 35 to 44.

In 1970, a relatively smaller proportion of Asian families were maintained by a woman with no husband present than were families in the total population (table 13-4). Also, a smaller proportion of Chinese families maintained by a woman had children under 18 years than similar families in the overall population; but a larger proportion of families maintained by Filipino women had children under 18 years than all such families (69 percent versus 55 percent). The proportion of comparable Japanese families with children under 18 years was about the same as that for such families in the general population.

Asian women were more likely to graduate from high school and college than women in the total population (table 13-5). The proportions of Asian women 25 years old and over who were high school graduates in 1970 were 67 percent for Japanese women, 64 percent for Filipino women, and 55 percent for Chinese women. (The comparable proportion for all women was 53 percent.) The proportions of Asian women completing 4 or more years of college ranged from 11 percent for Japanese women to 31 percent for Filipino women. (Only 8 percent of all women were in this category.)

Among younger Asian women, the proportions completing high school and college were even higher (table 13-6 and figure 13-1). For example, in 1970, 24 percent of Japanese women, 35 percent of Chinese women, and 42 percent of Filipino women 25 to 34 years old had completed

college. (The college completion rate was 12 percent for corresponding total women.)

In contrast to the achievements at the high school and college levels, relatively high proportions of Chinese women and Filipino women 25 years old and over had completed less than 8 years of elementary school. The proportions were 31 percent for Chinese women, 19 percent for Filipino women, and 15 percent for all women.

Among Asian women, the labor force participation rates in 1970 were higher than those for women in the total population (table 13-7). The participation rates ranged from 49 percent for Japanese women to 55 percent for Filipino women, compared with 41 percent for total women. As was true for all women, labor force participation rates varied considerably by age for Asian women. For example, five-eighths (63 percent) of Japanese women 20 to 24 years old were in the labor force, as compared with about one-half (49 percent) of Japanese women 25 to 34 years old (table 13-8 and figure 13-2).

Japanese and Chinese women were less likely to be unemployed in 1970 than women in the total population. Their unemployment rates were 3 and 4 percent, respectively. The unemployment rate for Filipino women was closer to the rate for all women—about 5 percent.

Like all women, employed Asian women were concentrated primarily in white-collar occupations (table 13-9). Larger proportions of employed Chinese and Filipino women held professional and technical jobs in 1970 than all women. The proportion of Filipino women holding professional and technical jobs in 1970 was also greater than that for Filipino men. The proportions of Japanese and Filipino women holding service jobs were about the same as for all women (20 percent); the percentage was somewhat lower for Chinese women (15 percent). Other occupational concentrations differed markedly among Asian women; for example, Chinese women were more likely than Japanese and Filipino women to be employed in operative positions, whereas Filipino women were more likely than other Asian women to be employed in professional and technical jobs.

The median income of Asian women, as with women in the general population, was low in 1969 (table 13-10). The median income levels ranged from \$2,640 for Chinese women to \$3,480 for Filipino women; the median income for all women was \$2,330. Among Asian women, the proportions with incomes under \$3,000 ranged from 44 percent for Filipino women to 54 percent for Chinese women. The proportions with incomes over \$10,000 were about 5 percent for each of the three groups of Asian women.

The median incomes of Asian women in 1969 were substantially below those of Asian men. The disparity between women and men was the smallest for Filipinos and greatest for Japanese.

⁵U.S. Department of Justice, Immigration and Naturalization Service, *1976 Annual Report: Immigration and Naturalization Service*.

The poverty rates in 1969 for Chinese and Japanese families maintained by women were considerably less than the corresponding rate for all families maintained by women (table 13-11). Twenty percent of Chinese families maintained by women and 25 percent of comparable Japanese families

were below the poverty level, as opposed to 32 percent of all families maintained by a woman. However, corresponding Filipino families were more likely to be below the poverty level than were all such families—about 40 percent of Filipino families maintained by a woman were poor in 1969.

FIGURE 13-1.
Percent of Women 25 to 34 Years Old Who Completed High School and College, by Selected Races: 1970

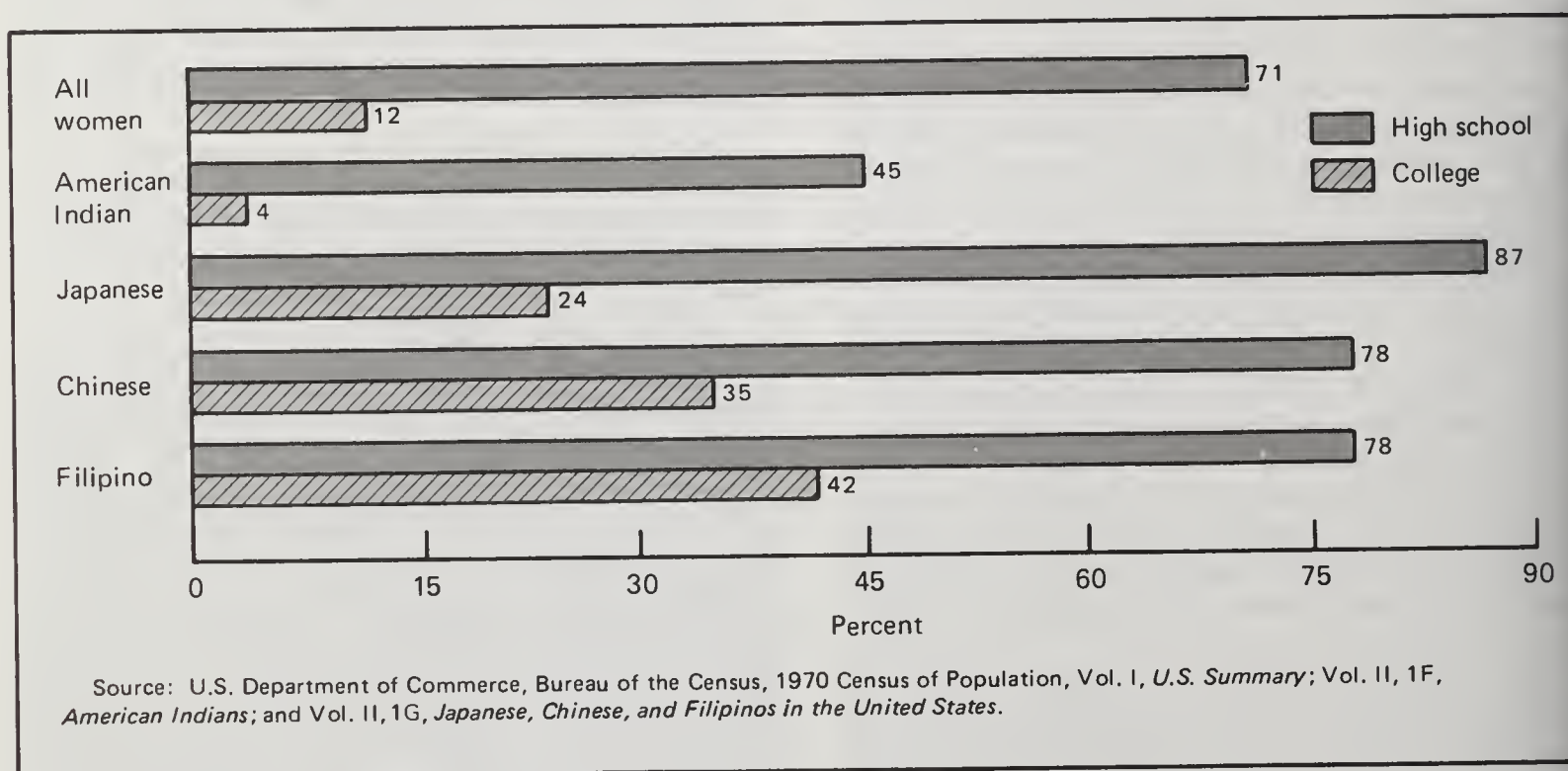


FIGURE 13-2.
Percent of Women in the Labor Force, by Selected Races and Age: 1970

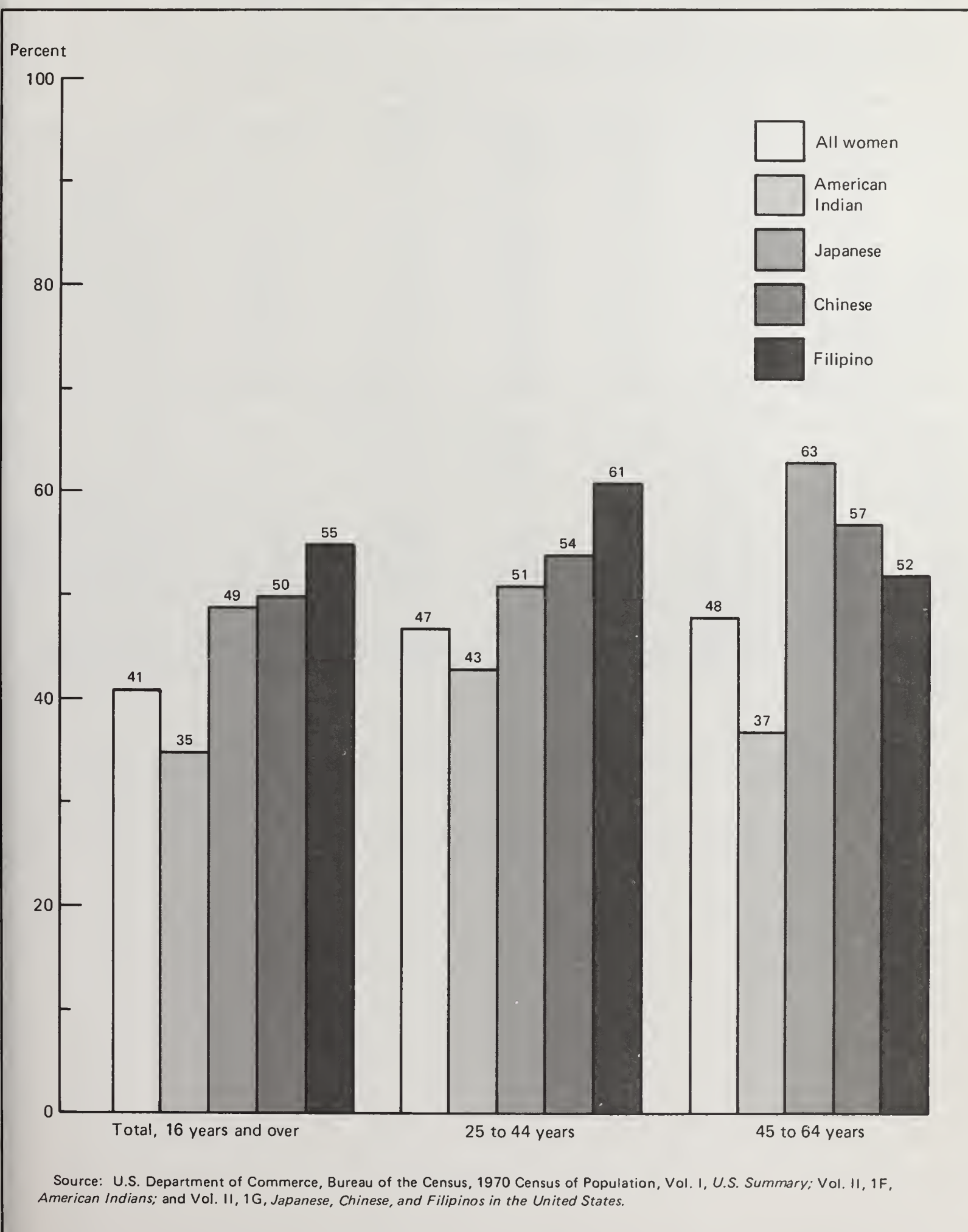


Table 13-1. Age and Urban and Rural Residence of Women, by Selected Races: 1970

(Numbers in thousands. Resident population)

Age and residence	All races	Selected races			
		American Indian	Japanese	Chinese	Filipino
Total, all ages.....	104,300	388	317	205	154
AGE					
Percent.....	100.0	100.0	100.0	100.0	100.0
Under 5 years.....	8.1	11.7	6.0	8.5	11.9
5 to 14 years.....	19.2	25.8	15.4	18.9	20.7
15 to 24 years.....	17.2	19.4	15.3	21.3	18.5
25 to 34 years.....	12.2	12.9	14.2	15.8	22.6
35 to 44 years.....	11.4	10.1	21.1	13.8	13.5
45 to 54 years.....	11.5	8.0	13.8	9.5	6.8
55 to 64 years.....	9.4	6.1	5.7	6.5	3.4
65 years and over.....	11.2	6.0	8.4	5.7	2.5
Median age.....	29.3	20.9	34.3	25.8	24.5
Sex ratio ¹	94.8	96.7	85.7	110.7	119.3
RESIDENCE					
Percent.....	100.0	100.0	100.0	100.0	100.0
Urban.....	74.2	45.2	89.2	96.5	87.5
Rural.....	25.8	54.8	10.8	3.5	12.5

¹Number of males per 100 females.

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. I, U.S. Summary; Vol. II, 1F, American Indians; and Vol. II, 1G, Japanese, Chinese, and Filipinos in the United States.

Table 13-2. Japanese, Chinese, and Filipino Women, by Nativity and Age: 1970

(Numbers in thousands. Resident population. For meaning of symbols, see text)

Age	Japanese				Chinese	
	Total women	Percent	Native	Foreign born	Total women	Percent
All ages.....	¹ 316	100.0	73.7	26.3	¹ 206	100.0
Under 5 years.....	19	100.0	92.3	7.7	18	100.0
5 to 14 years.....	49	100.0	95.8	4.2	39	100.0
15 to 24 years.....	48	100.0	91.4	8.6	44	100.0
25 to 34 years.....	44	100.0	62.2	37.8	33	100.0
35 to 44 years.....	67	100.0	52.2	47.8	29	100.0
45 to 54 years.....	44	100.0	85.4	14.6	20	100.0
55 to 64 years.....	18	100.0	83.3	16.7	13	100.0
65 years and over.....	27	100.0	35.2	64.8	12	100.0
Median age.....	34.5	(X)	27.7	39.8	25.8	(X)
Sex ratio ²	85.8	(X)	99.5	47.4	110.1	(X)
Age	Chinese-continued		Filipino			
	Native	Foreign born	Total women	Percent	Native	Foreign born
All ages.....	52.3	47.7	¹ 154	100.0	49.3	50.7
Under 5 years.....	91.0	9.0	19	100.0	84.5	15.5
5 to 14 years.....	77.0	23.0	32	100.0	75.6	24.4
15 to 24 years.....	57.0	43.0	29	100.0	54.0	46.0
25 to 34 years.....	30.9	69.1	35	100.0	25.4	74.6
35 to 44 years.....	37.7	62.3	20	100.0	31.5	68.5
45 to 54 years.....	42.6	57.4	11	100.0	27.9	72.1
55 to 64 years.....	31.6	68.4	5	100.0	24.9	75.1
65 years and over.....	30.7	69.3	4	100.0	33.3	66.7
Median age.....	17.8	33.7	24.4	(X)	14.3	30.3
Sex ratio ²	112.3	107.7	119.0	(X)	108.0	129.7

¹Figures for total in this table may vary slightly from those presented in table 13-1 because of different sample sizes.²Number of males per 100 females.Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. I, U.S. Summary.

Table 13-3. Marital Status and Children Ever Born for Women, by Selected Races: 1970

(Resident population)

(Resident population)

Marital status and children ever born	All races	Selected races			
		American Indian	Japanese	Chinese	Filipino
MARITAL STATUS					
Total women, 14 years and over.....(thousands)...	77,910	252	254	152	106
Percent.....	100.0	100.0	100.0	100.0	100.0
Never married.....	22.6	27.9	23.3	31.2	31.2
Married, husband present.....	57.1	50.3	61.3	56.0	55.3
Separated.....	2.2	3.7	0.9	0.8	1.4
Other married, husband absent.....	1.9	3.1	2.5	2.5	6.1
Widowed.....	12.3	9.7	9.1	7.8	3.8
Divorced.....	3.9	5.2	2.8	1.6	2.1
CHILDREN EVER BORN					
Women ever married, 15 to 24 years old.....(thousands)...	6,453	27	10	8	10
Children per 1,000 women ever married.....	995	1,376	759	786	1,086
Women ever married, 25 to 34 years old.....(thousands)...	11,417	44	39	28	27
Children per 1,000 women ever married.....	2,374	3,255	1,656	1,778	2,018
Women ever married, 35 to 44 years old.....(thousands)...	11,197	37	63	27	19
Children per 1,000 women ever married.....	3,132	4,554	2,301	3,005	3,300

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. I, U.S. Summary; Vol. II, 1F, American Indians; Vol. II, 1G, Japanese, Chinese, and Filipinos in the United States; and Vol. II, 4C, Marital Status.

Table 13-4. Marital Status and Presence of Own Children for Families With Female Householder,
No Husband Present, by Selected Races: 1970

(Numbers in thousands. Resident population)

Marital status and presence of children	All races	Selected races			
		American Indian	Japanese	Chinese	Filipino
All families with female householder, no husband present.....	5,515	27	14	6	6
Percent of total families.....	10.8	18.4	10.3	6.7	8.6
MARITAL STATUS					
Percent.....	100.0	100.0	100.0	100.0	100.0
Never married.....	12.5	12.9	13.0	13.3	17.9
Separated.....	16.7	18.3	8.2	6.3	9.0
Other married, husband absent.....	5.9	7.6	17.4	11.7	33.8
Widowed.....	41.1	36.1	37.9	49.5	20.8
Divorced.....	23.8	25.1	23.5	19.1	18.5
PRESENCE OF OWN CHILDREN UNDER 18 YEARS					
Percent.....	100.0	100.0	100.0	100.0	100.0
With no own children under 18.....	45.3	34.5	44.0	51.5	31.2
With own children under 18.....	54.7	65.5	56.0	48.5	68.8
With own children under 6.....	20.6	31.6	15.4	12.5	39.1

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. II, 1F, American Indians; Vol. II, 1G, Japanese, Chinese, and Filipinos in the United States; and Vol. II, 4A, Family Composition.

Table 13-5. Years of School Completed by Persons 25 Years Old and Over, by Selected Races and Sex: 1970
(Numbers in thousands. Resident population)

Sex and years of school completed	All races	Selected races			
		American Indian	Japanese	Chinese	Filipino
WOMEN					
Total, 25 years old and over...	58,030	167	201	105	75
Percent.....	100.0	100.0	100.0	100.0	100.0
Elementary: 0 to 4 years.....	5.0	14.7	4.5	20.5	9.1
5 to 7 years.....	9.6	14.6	6.7	10.8	9.9
8 years.....	12.6	12.8	8.7	5.2	4.6
High school: 1 to 3 years.....	20.1	24.9	13.0	8.7	12.7
4 years.....	34.1	22.8	42.7	23.8	20.4
College: 1 to 3 years.....	10.6	7.1	13.3	11.4	12.8
4 or more years.....	8.1	3.1	11.1	19.6	30.5
Median school years completed.....	12.1	9.9	12.4	12.2	12.7
Percent high school graduates.....	52.8	33.0	67.2	54.9	63.7
MEN					
Total, 25 years old and over...	51,870	155	153	122	102
Percent.....	100.0	100.0	100.0	100.0	100.0
Elementary: 0 to 4 years.....	6.1	16.3	3.8	12.5	19.5
5 to 7 years.....	10.6	15.2	5.9	10.6	13.0
8 years.....	12.9	13.4	8.2	6.0	5.4
High school: 1 to 3 years.....	18.6	21.6	11.2	10.7	13.9
4 years.....	27.7	21.2	34.8	18.8	19.5
College: 1 to 3 years.....	10.7	7.9	13.9	10.6	12.0
4 or more years.....	13.5	4.5	22.3	30.8	16.6
Median school years completed.....	12.1	9.7	12.6	12.5	11.6
Percent high school graduates.....	51.9	33.6	70.9	60.3	48.1

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. I, U.S. Summary; Vol. II, 1F, American Indians; and Vol. II, 1G, Japanese, Chinese, and Filipinos in the United States.

Table 13-6. Percent of Women 20 Years Old and Over Who Completed High School and College, by Selected Races and Age: 1970

(Resident population)

Level of school completed and age	All races	Selected races			
		American Indian	Japanese	Chinese	Filipino
Percent high school graduates:					
20 to 24 years.....	78.9	57.7	93.4	85.4	81.1
25 to 34 years.....	71.2	44.8	86.6	78.1	78.1
35 to 44 years.....	62.7	34.8	78.8	59.3	64.1
45 to 64 years.....	49.3	28.4	58.2	42.0	41.1
65 years and over.....	29.1	14.9	25.4	15.5	16.1
Percent college graduates:					
20 to 24 years.....	8.3	1.8	17.5	14.7	23.1
25 to 34 years.....	12.1	3.9	24.3	35.2	42.1
35 to 44 years.....	8.9	3.1	10.0	17.6	28.1
45 to 64 years.....	7.1	2.8	6.2	11.2	14.1
65 years and over.....	4.9	2.4	2.6	4.5	4.1

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. I, U.S. Summary; Vol. II, 1F, American Indians; and Vol. II, 1G, Japanese, Chinese, and Filipinos in the United States.

Table 13-7. Employment Status, by Selected Races and Sex: 1970

(Numbers in thousands. Resident population 16 years and over)

Sex and employment status	All races	Selected races			
		American Indian	Japanese	Chinese	Filipino
MEN					
Total, 16 years and over.....	73,852	233	244	145	101
Labor force.....	30,547	82	121	72	56
Percent of total.....	41.4	35.3	49.4	49.5	55.2
Civilian labor force.....	30,502	82	120	72	55
Employed.....	28,930	74	117	69	53
Unemployed.....	1,572	8	4	3	3
Percent of civilian labor force.....	5.2	10.2	3.0	3.7	4.7
Not in labor force.....	43,305	151	123	73	45
WOMEN					
Total, 16 years and over.....	67,236	220	195	164	126
Labor force.....	51,502	139	155	120	99
Percent of total.....	76.6	63.4	79.3	73.2	79.0
Civilian labor force.....	49,549	132	150	118	83
Employed.....	47,624	116	147	114	79
Unemployed.....	1,925	15	3	3	4
Percent of civilian labor force.....	3.9	11.6	2.0	3.0	4.7
Not in labor force.....	15,733	80	40	44	26

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. I, U.S. Summary; Vol. II, 1F, American Indians; and Vol. II, 1G, Japanese, Chinese, and Filipinos in the United States.

Table 13-8. Labor Force Participation Rates for Women, by Selected Races and Age: 1970

(Number in labor force as percent of population in specific group. Resident population 16 years and over)

	All races	Selected races			
		American Indian	Japanese	Chinese	Filipino
Total, 16 years and over.....	41.4	35.3	49.4	49.5	55.2
15 to 19 years.....	34.9	21.3	32.7	34.5	31.6
20 to 24 years.....	56.1	44.8	63.2	55.7	62.6
25 to 34 years.....	44.9	42.5	48.9	50.3	60.2
35 to 44 years.....	50.3	43.4	52.7	59.1	62.3
45 to 64 years.....	47.8	36.9	62.7	57.4	52.2
65 years and over.....	10.0	8.5	12.0	12.0	11.4

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. I, U.S. Summary; Vol. II, 1F, American Indians; and Vol. II, 1G, Japanese, Chinese, and Filipinos in the United States.

Table 13-9. Major Occupation Group of Employed Persons, by Selected Races and Sex: 1970

(Numbers in thousands. Resident population 16 years and over)

Sex and occupation group	All races	Selected races			
		American Indian	Japanese	Chinese	Filipino
WOMEN					
Total, 16 years and over.....	73,852	233	244	145	101
Employed.....	28,930	74	117	69	53
Percent.....	100.0	100.0	100.0	100.0	100.0
White-collar workers.....	61.7	42.5	61.0	60.1	66.3
Professional, technical, and kindred workers.	15.7	11.1	15.9	19.4	31.8
Managers and administrators, except farm.....	3.6	2.4	3.8	3.8	1.7
Sales workers.....	7.4	4.0	6.9	5.1	3.7
Clerical and kindred workers.....	34.9	25.1	34.3	31.8	29.1
Blue-collar workers.....	17.1	22.1	16.1	24.6	12.6
Craft and kindred workers.....	1.8	2.1	1.8	1.2	1.1
Operatives, including transport.....	14.3	18.7	13.5	22.5	10.8
Laborers, except farm.....	1.0	1.3	0.8	0.9	0.7
Farm workers.....	0.8	2.3	2.1	0.5	1.9
Service workers.....	20.4	33.0	20.8	14.8	19.2
Service workers, except private household....	16.6	26.3	17.0	12.8	17.0
Private household workers.....	3.8	6.7	3.9	2.0	2.3
MEN					
Total, 16 years and over.....	67,236	220	195	164	126
Employed.....	47,624	116	147	114	79
Percent.....	100.0	100.0	100.0	100.0	100.0
White-collar workers.....	40.0	22.4	48.2	54.1	32.5
Professional, technical, and kindred workers.	14.3	9.2	21.4	28.9	18.1
Managers and administrators, except farm.....	11.2	5.0	11.7	11.4	3.1
Sales workers.....	6.9	2.4	6.0	4.4	2.1
Clerical and kindred workers.....	7.6	5.7	9.0	9.4	9.2
Blue-collar workers.....	47.3	59.2	40.0	21.1	35.5
Craft and kindred workers.....	21.2	22.1	19.7	7.3	13.1
Operatives, including transport.....	19.5	23.9	10.3	10.5	14.3
Laborers, except farm.....	6.6	13.2	9.9	3.3	8.2
Farm workers.....	4.5	8.0	5.2	0.7	11.7
Service workers.....	8.1	10.5	6.6	24.0	20.3
Service workers, except private household....	8.1	10.3	6.3	23.6	19.9
Private household workers.....	0.1	0.1	0.2	0.4	0.3

Source: U.S. Department of Commerce, Bureau of the the Census, 1970 Census of Population, Vol. I, U.S. Summary; Vol. II, 1F, American Indians; and Vol. II, 1G, Japanese, Chinese, and Filipinos in the United States.

Table 13-10. Income, by Selected Races and Sex: 1969

(Numbers in thousands. Persons 14 years and over as of 1970. Resident population)

Sex and income	All races	Selected races			
		American Indian	Japanese	Chinese	Filipino
WOMEN					
Total, 14 years and over.....	77,916	252	254	152	106
Total with income.....	50,018	152	165	96	68
Percent.....	100.0	100.0	100.0	100.0	100.0
\$1 to \$999 or less.....	27.3	36.2	22.3	25.5	20.2
\$1,000 to \$1,999.....	18.8	21.1	15.2	17.0	13.0
\$2,000 to \$2,999.....	12.0	12.7	10.4	11.7	11.2
\$3,000 to \$3,999.....	11.0	10.2	10.6	10.7	11.7
\$4,000 to \$4,999.....	9.0	6.5	9.8	9.0	11.0
\$5,000 to \$6,999.....	12.1	8.0	16.2	12.7	16.4
\$7,000 to \$7,999.....	3.4	2.1	5.1	3.9	5.1
\$8,000 to \$9,999.....	3.4	1.6	5.8	4.8	6.7
\$10,000 to \$14,999.....	2.3	1.1	3.8	3.6	3.5
\$15,000 or more.....	0.9	0.3	0.9	1.1	1.1
Median income.....	\$2,330	\$1,654	\$3,200	\$2,642	\$3,476
MEN					
Total, 14 years and over.....	71,482	239	206	172	131
Total with income.....	6,410	194	185	149	118
Percent.....	100.0	100.0	100.0	100.0	100.0
\$1 to \$999 or less.....	10.1	20.3	9.7	13.0	8.9
\$1,000 to \$1,999.....	9.7	14.8	9.5	11.8	11.6
\$2,000 to \$2,999.....	7.3	11.1	6.2	8.6	10.6
\$3,000 to \$3,999.....	6.7	9.5	5.4	8.3	9.5
\$4,000 to \$4,999.....	6.1	8.1	4.6	7.5	9.6
\$5,000 to \$6,999.....	14.2	14.4	11.1	12.4	18.9
\$7,000 to \$7,999.....	7.8	5.6	7.3	5.5	7.7
\$8,000 to \$9,999.....	13.3	7.7	13.8	9.2	10.7
\$10,000 to \$14,999.....	16.2	6.5	21.4	14.4	9.1
\$15,000 or more.....	8.7	1.8	10.9	9.3	3.3
Median income.....	\$6,446	\$3,394	\$7,472	\$5,125	\$4,972

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. I, U.S. Summary; Vol. II, 1F, American Indians; and Vol. II, 1G, Japanese, Chinese, and Filipinos in the United States.

Table 13-11. Family Income and Poverty Status of Families With Female Householder, No Husband Present, by Selected Races: 1969

(Numbers in thousands. Families as of 1970. Resident population)

(Numbers in thousands. Families as of 1970. SOURCE: U.S. Census Bureau, Current Population Reports, 1970, Series H-22, Table 1.)

Family income and poverty status	All races	Selected races			
		American Indian	Japanese	Chinese	Filipino
ALL INCOME LEVELS					
All families with female householder, no husband present.....	5,539	27	14	6	6
Percent.....	100.0	100.0	100.0	100.0	100.0
Less than \$1,000.....	10.0	16.2	11.9	7.7	20.8
\$1,000 to \$1,999.....	9.6	15.3	5.6	5.0	6.7
\$2,000 to \$2,999.....	10.9	15.7	5.8	6.8	7.9
\$3,000 to \$3,999.....	10.5	13.9	8.8	8.2	10.1
\$4,000 to \$4,999.....	9.3	9.2	7.6	8.6	6.4
\$5,000 to \$6,999.....	16.0	13.5	13.9	16.6	15.2
\$7,000 to \$7,999.....	6.2	4.5	7.0	7.3	4.0
\$8,000 to \$9,999.....	9.4	5.3	10.3	11.6	8.8
\$10,000 to \$14,999.....	11.8	4.8	17.1	15.4	10.7
\$15,000 or more.....	6.2	1.6	12.1	12.8	9.4
Median income.....	\$4,962	\$3,198	\$6,467	\$6,627	\$4,708
INCOME LESS THAN POVERTY LEVEL					
Total families with female householder, no husband present.....	1,790	15	3	1	2
Percent of all families with female householder, no husband present.....	32.3	55.7	24.7	20.3	39.6

Source: U.S. Department of Commerce, Bureau of the Census, 1970 Census of Population, Vol. I, U.S. Summary; Vol. II, 1F, American Indians; Vol. II, 1G, Japanese, Chinese, and Filipinos in the United States; and Vol. II, 9A, Low-Income Population.

Chapter 14

Spanish-Origin Women



Estimates for women of Spanish origin presented in this chapter are based on data obtained in the March 1978 Current Population Survey (CPS) and the 1977 National Crime Survey (NCS). Comparisons of characteristics of Spanish-origin women from the 1978 CPS with data from previous years do not appear in this chapter because of the large sampling variability associated with the estimates and differences in classification.

Social characteristics. Women of Spanish origin are, on the average, younger than other women not of Spanish origin; in 1978, the median age of Spanish-origin women was 22.8 years, compared with a median age of 31.2 years for women not of Spanish origin (table 14-1). About 1 of every 8 females of Spanish origin was under 5 years old, but only 1 of every 16 females not of Spanish origin was under 5 years old. In addition, a much lower proportion of Spanish-origin women were 65 years and over (5 percent) than were women not of Spanish origin (13 percent).

In 1978, the proportion never married among Spanish-origin women was greater than that for other women, but the proportion divorced was about the same as that for other women (table 14-2). Although Spanish-origin women were about as likely to be married as other women in 1978, the proportion of married Spanish women with husband absent was twice as high as that for other women. A larger proportion of women of Puerto Rican origin were divorced or married with husband absent than were women in the other subcategories of Spanish origin.

About 561,000 Spanish-origin families were maintained by a woman with no husband present in 1978 (table 14-3). Ninety-two percent of these families were living in metropolitan areas, mostly residing in the central cities of these areas. However, place of residence among families maintained by a woman with no husband present varied by type of Spanish origin. In 1978, almost all (98 percent) of the families maintained by a woman of Puerto Rican origin were living in metropolitan areas, with 89 percent residing in central cities; in contrast, 86 percent of families maintained by a woman of Mexican origin were metropolitan-area dwellers, with 52 percent living in central cities. Families maintained by Spanish-origin women were much less likely to live in nonmetropolitan areas than similar other families (8 and 29 percent, respectively).

In 1978, families maintained by a woman of Spanish origin tended to be larger, on the average, than the corresponding families in the total population (table 14-4). About 19 percent of families maintained by a woman of Spanish origin had five or more persons in the family,

compared with only 13 percent of all such families. In addition, about 46 percent of all families maintained by a woman contained two persons, while only about 35 percent of similar Spanish families were two-person families.

Women of Spanish origin lagged significantly behind all women in the population in educational attainment; in 1978, about 40 percent of Spanish women 25 years and over had completed 4 years of high school or more, compared with 65 percent of all women of that age in the Nation (table 14-5 and figure 14-1). However, younger women of Spanish origin have been narrowing this gap in educational attainment; 55 percent of Spanish-origin women 25 to 29 years old had completed 4 years of high school or more, compared with only 15 percent of Spanish-origin women 65 years old and over. In 1978, Spanish women 25 years and over were only one-half as likely to have completed 4 or more years of college as women of the same age in the general population (6 percent for Spanish women versus 12 percent for all women).

Economic characteristics. In 1978, the civilian labor force participation rate was 45 percent for Spanish-origin women, compared with 49 percent for all women (table 14-6). In addition, the unemployment rate for Spanish women was, at 10 percent, higher than the rate of 7 percent for all women. Labor force participation rates differed by type of Spanish origin: about 47 percent of women of Mexican origin and 49 percent of women of Cuban or other Spanish origin were in the civilian labor force in 1978, compared with only 32 percent of women of Puerto Rican origin.

Occupational characteristics of employed women of Spanish origin differed considerably in 1978 from those of employed women not of Spanish origin. For instance, working women of Spanish origin were more likely than other working women to be employed as blue-collar workers (28 percent versus 14 percent). In contrast, only 48 percent of employed Spanish women were white-collar workers, as compared with 65 percent of other employed women. Marked differences in occupational distribution also existed among women by type of Spanish origin; in particular, an appreciably larger proportion of Mexican-origin women than of Puerto Rican-origin women were employed as service workers (25 percent versus 12 percent). The proportion of Mexican-origin women employed as farm workers, however, was not significantly higher than for women of either Puerto Rican or Cuban origin.

In 1978, "keeping house" was the major activity of both Spanish and other women not in the labor force (table 14-7). Only 13 percent of Spanish-origin women 20 to 24 years

old not in the labor force were going to school, compared with 28 percent of corresponding other women.

Women of Spanish origin had a slightly lower median income in 1977 (\$3,670) than did other women (\$3,960) (table 14-8). The median incomes of women by type of Spanish origin ranged from \$3,350 for women of Mexican origin to \$4,180 for women of Puerto Rican origin.

Earnings in 1977 of professional women of Spanish origin (\$8,850) were not, on the average, significantly different from earnings of professional women not of Spanish origin (\$9,170) (table 14-9). In addition, median earnings of Spanish women employed as service workers (except private household workers) did not differ significantly from the median earnings of other women so employed. However, Spanish women employed as clerical workers had lower median earnings (\$5,150) than other women similarly employed (\$6,090).

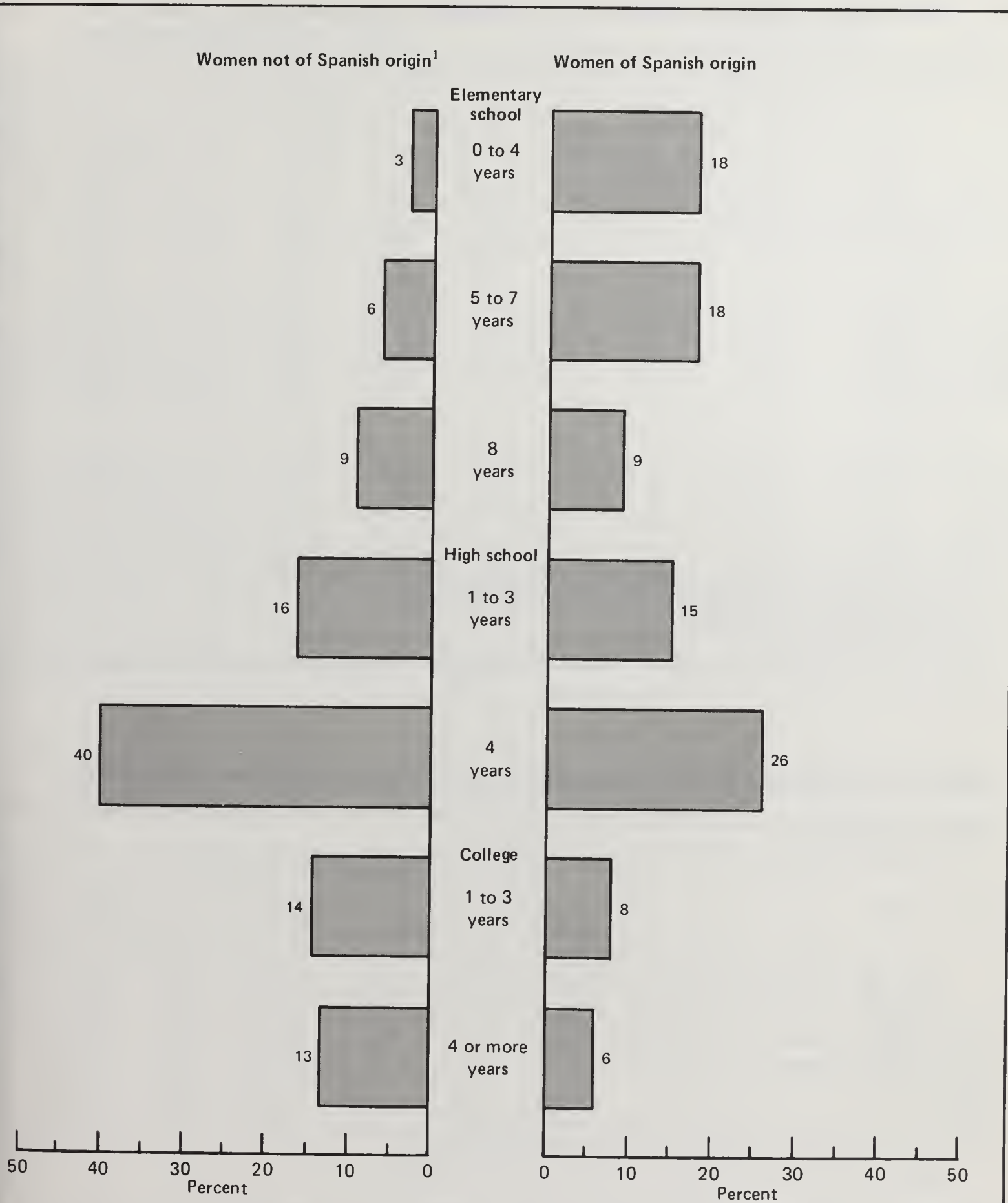
Spanish-origin women earning wages or salaries as government employees in 1977 had substantially lower median earnings (\$4,340) than other women earning wages or salaries in government employment (\$6,850). The difference in median earnings between Spanish women (\$4,170) and other women (\$4,480) employed in private industry was not statistically significant.

A substantial proportion (about 54 percent) of families maintained by a woman of Spanish origin were below the poverty level in 1977 (table 14-10). In contrast, about 32 percent of all families in the Nation maintained by a woman were below the poverty level.

Crime victimization. Proportionally more Spanish-origin women than other women suffered crimes of violence in 1977 (table 14-11). The victimization rate for crimes of violence against Spanish-origin women 12 years old and over was 32 per 1,000 compared with 22 per 1,000 for other women. Specifically, about 24 of every 1,000 women of Spanish origin were assaulted in 1977 compared with 17 of every 1,000 other women. Also, there is some evidence that the victimization rate for rape among Spanish women was higher (3.5 per 1,000) than the rate for other women (1.5 per 1,000).

The victimization rate for crimes of theft against Spanish-origin women (84 per 1,000 women) was not significantly different from the rate for other women (88 per 1,000). However, the victimization rate for crimes of theft against Spanish women 12 to 15 years old (62 per 1,000) was about one-half the rate for other women in that age group (132 per 1,000).

FIGURE 14-1.
Years of School Completed by Women 25 Years Old and Over, by Spanish Origin: 1978



¹ Includes women who did not know or did not report on origin.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 339; and unpublished 1978 Current Population Survey data.

Table 14-1. All Women and Women of Spanish Origin, by Age and Type of Spanish Origin: 1978

(Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks)

Age	All women	Women of Spanish origin					Women not of Spanish origin ²
		Total	Mexican	Puerto Rican	Cuban	Other Spanish ¹	
All ages.....	110,366	6,196	3,623	997	347	1,228	104,170
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Under 5 years.....	6.8	12.4	14.0	10.6	5.2	11.1	6.4
5 to 13 years.....	14.0	19.7	19.8	24.2	11.5	17.8	13.7
14 and 15 years.....	3.6	3.9	4.0	4.3	3.5	3.4	3.6
16 to 19 years.....	7.5	8.4	8.9	7.6	6.2	8.4	7.4
20 to 24 years.....	9.1	9.9	10.9	7.7	7.3	9.2	9.0
25 to 34 years.....	15.3	16.4	16.0	18.5	12.6	17.0	15.2
35 to 44 years.....	11.1	11.0	9.8	12.3	13.5	12.8	11.1
45 to 54 years.....	10.8	8.8	8.3	8.0	15.4	8.9	10.9
55 to 64 years.....	9.7	4.9	4.2	3.9	10.8	6.3	10.0
65 years and over.....	12.0	4.6	3.9	2.9	13.9	5.5	12.5
18 years and over.....	71.8	60.0	57.8	57.7	77.3	63.6	72.5
21 years and over.....	66.1	53.4	50.6	51.8	71.4	58.1	66.9
Median age.....	30.6	22.8	21.3	22.4	37.7	25.1	31.2
Sex ratio ³	94.0	94.4	97.4	82.7	98.6	94.0	94.0

¹Includes Central or South American and other Spanish origin.²Includes women who did not know or did not report on origin.³Number of males per 100 females.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 339.

Table 14-2. Marital Status of All Women and Women of Spanish Origin, by Type of Spanish Origin: 1978

(Numbers in thousands. Noninstitutional population 14 years and over excluding members of the Armed Forces living in barracks)

Marital status	All women	Women of Spanish origin					Women not of Spanish origin ²
		Total	Mexican	Puerto Rican	Cuban	Other Spanish ¹	
Total women, 14 years and over.	87,399	4,212	2,398	650	289	875	83,187
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Never married.....	23.9	27.8	28.5	27.2	19.3	29.1	23.7
Married, husband present.....	54.8	52.4	55.5	40.2	58.3	51.0	55.0
Married, husband absent.....	3.6	7.1	5.2	16.2	3.9	6.4	3.5
Separated.....	2.8	5.5	3.7	14.1	2.4	5.0	2.6
Widowed.....	11.6	6.2	5.7	5.8	8.7	7.0	11.9
Divorced.....	6.0	6.6	5.1	10.6	9.8	6.6	6.0

¹Includes Central or South American and other Spanish origin.²Includes women who did not know or did not report on origin.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 339; and unpublished 1978 Current Population Survey data.

Table 14-3. Families With Female Householder, No Husband Present, by Metropolitan-Nonmetropolitan Residence and Type of Spanish Origin: 1978

(Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks)

Type of residence	Families with female householder, no husband present					
	Total	Spanish origin				Not of Spanish origin ²
		Total	Mexican	Puerto Rican	Other Spanish ¹	
NUMBER						
United States.....	8,236	561	252	179	131	7,675
Metropolitan areas.....	5,973	514	217	174	123	5,459
In central cities.....	3,353	366	132	159	75	2,987
Outside central cities.....	2,620	148	85	15	48	2,472
Nonmetropolitan areas.....	2,263	47	35	4	8	2,216
PERCENT						
United States.....	100.0	100.0	100.0	100.0	100.0	100.0
Metropolitan areas.....	72.5	91.6	86.1	97.7	93.8	71.1
In central cities.....	40.7	65.2	52.3	89.3	57.0	38.9
Outside central cities.....	31.8	26.4	33.8	8.4	36.8	32.2
Nonmetropolitan areas.....	27.5	8.4	13.9	2.3	6.2	28.9

¹Includes families of Cuban, Central or South American, and other Spanish origin.

²Includes families with female householder who did not know or did not report on origin.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 39; and unpublished 1978 Current Population Survey data.

Table 14-4. Selected Characteristics of Families With Female Householder, No Husband Present, by Type of Spanish Origin: 1978

(Noninstitutional population excluding members of the Armed Forces living in barracks)

Characteristic	Total	Spanish origin			
		Total	Mexican	Puerto Rican	Other Spanish ¹
Total persons in families with female householder, no husband present.....(thousands)..	25,404	1,890	904	607	380
All families with female householder, no husband present.....(thousands)..	8,236	561	252	179	131
Percent.....	100.0	100.0	100.0	100.0	100.0
2 persons.....	46.2	35.2	31.2	32.7	46.2
3 persons.....	26.4	26.8	25.9	23.3	33.3
4 persons.....	14.0	18.6	19.5	23.0	11.0
5 persons.....	7.4	10.0	9.4	13.9	6.0
6 persons.....	3.2	6.0	8.9	4.3	2.5
7 or more persons.....	2.8	3.4	5.1	2.8	1.0
Mean number of persons.....	3.08	3.37	3.59	3.40	2.90
Mean number of members:					
Under 18 years.....	1.37	1.77	1.83	2.06	1.29
18 to 64 years.....	1.49	1.49	1.62	1.31	1.48
65 years and over.....	0.23	0.10	0.14	0.02	0.14
Mean number of own children:					
Under 18 years.....	1.22	1.62	1.60	1.97	1.16
Under 6 years.....	0.29	0.48	0.47	0.57	0.38
Under 3 years.....	0.12	0.22	0.22	0.25	0.19

¹Includes Cuban, Central or South American, and other Spanish origin.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 339 and 340.

Table 14-5. Percent of All Women and Women of Spanish Origin 25 Years Old and Over, by Years of School Completed, Type of Spanish Origin, and Age: 1978

(Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Years of school completed and age	All women	Women of Spanish origin				Women not of Spanish origin ²
		Total	Mexican	Puerto Rican	Other Spanish ¹	
PERCENT COMPLETED LESS THAN 5 YEARS OF SCHOOL						
Total women, 25 years and over.....	3.4	17.9	24.4	15.7	7.4	2.7
25 to 29 years.....	1.0	6.4	8.9	6.6	-	0.7
30 to 34 years.....	1.1	8.2	9.3	8.8	5.2	0.6
35 to 44 years.....	1.5	11.3	17.1	9.5	2.5	0.9
45 to 64 years.....	3.1	25.9	36.0	23.8	10.5	2.2
65 years and over.....	8.8	47.6	68.0	(B)	20.2	7.8
PERCENT COMPLETED 4 YEARS OF HIGH SCHOOL OR MORE						
Total women, 25 years and over.....	65.2	39.6	32.1	36.0	55.1	66.3
25 to 29 years.....	84.6	54.7	47.9	47.5	75.4	86.5
30 to 34 years.....	80.8	49.9	45.2	44.9	65.2	82.7
35 to 44 years.....	74.2	45.0	35.5	39.0	65.2	75.9
45 to 64 years.....	62.4	28.0	19.3	24.0	44.0	63.7
65 years and over.....	39.2	15.1	4.8	(B)	29.8	39.7
PERCENT COMPLETED 4 OR MORE YEARS OF COLLEGE						
Total women, 25 years and over.....	12.2	5.7	3.9	3.6	10.3	12.5

¹Includes Cuban, Central or South American, and other Spanish origin.

²Includes women who did not know or did not report on origin.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, no. 339; and unpublished 1978 Current Population Survey data.

Table 14-6. Employment Status and Major Occupation Group of All Women and Women of Spanish Origin, by Type of Spanish Origin: 1978

(Numbers in thousands. Noninstitutional population 16 years and over excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Employment status and occupation	All women	Women of Spanish origin					Women not of Spanish origin ²
		Total	Mexican	Puerto Rican	Cuban	Other Spanish ¹	
Total women, 16 years and over.	83,374	3,970	2,251	608	277	833	79,404
In civilian labor force.....	40,971	1,801	1,057	197	136	411	39,170
Percent unemployed.....	7.0	10.4	11.4	12.2	4.4	9.5	6.9
Employed.....	38,099	1,613	938	173	130	372	36,486
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White-collar workers.....	63.9	48.0	44.8	56.3	52.4	51.1	64.6
Professional, technical, and kindred workers.....	16.1	8.9	7.6	9.9	12.8	10.2	16.4
Managers and administrators, except farm.....	6.3	4.0	3.5	5.0	5.5	4.0	6.4
Sales workers.....	6.8	5.8	5.6	6.9	7.0	5.4	6.9
Clerical and kindred workers.....	34.7	29.4	28.1	34.4	27.1	30.6	34.9
Blue-collar workers.....	14.5	28.2	29.1	30.9	30.4	24.2	13.9
Craft and kindred workers.....	1.7	1.8	1.9	2.0	3.3	1.1	1.7
Operatives, including transport....	11.8	25.2	25.7	27.3	27.1	22.6	11.2
Laborers, except farm.....	1.0	1.2	1.5	1.5	-	0.5	1.0
Farm workers.....	1.1	1.1	1.6	0.9	0.7	0.3	1.1
Farmers and farm managers.....	0.2	-	0.1	-	-	-	0.2
Farm laborers and supervisors.....	0.9	1.1	1.6	0.9	0.7	0.3	0.9
Service workers.....	20.5	22.6	24.5	11.9	16.5	24.7	20.4

¹Includes Central or South American and other Spanish origin.

²Includes women who did not know or did not report on origin.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 339; and unpublished 1978 Current Population Survey data.

Table 14-7. Major Activity of Women Not in the Labor Force, by Spanish Origin and Age: 1978

(Numbers in thousands. Noninstitutional population 16 years and over excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Age and origin	Total women not in labor force	Percent	Major activity			
			Keeping house	Going to school	Unable to work	Other
Women of Spanish origin, 16 years and over.....	2,169	100.0	79.7	12.6	2.3	5.4
16 to 19 years.....	321	100.0	28.5	67.3	0.6	3.7
20 to 24 years.....	275	100.0	80.8	12.7	1.3	5.3
25 to 44 years.....	821	100.0	94.2	2.5	0.8	2.4
45 to 54 years.....	270	100.0	92.3	-	2.6	5.2
55 to 64 years.....	213	100.0	89.2	0.8	4.2	5.7
65 years and over.....	269	100.0	74.8	-	8.5	16.7
Women not of Spanish origin, 16 years and over ¹	40,234	100.0	77.1	10.7	2.6	9.6
16 to 19 years.....	3,975	100.0	16.2	77.8	0.2	5.8
20 to 24 years.....	3,126	100.0	63.1	27.8	0.8	8.3
25 to 44 years.....	10,291	100.0	90.9	3.1	1.1	4.9
45 to 54 years.....	4,887	100.0	90.9	0.6	2.3	6.2
55 to 64 years.....	6,045	100.0	86.4	0.1	3.6	9.9
65 years and over.....	11,910	100.0	78.8	-	4.7	16.5

¹Includes women who did not know or did not report on origin.

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 14-8. Income of All Women and Women of Spanish Origin, by Type of Spanish Origin: 1977

(Numbers in thousands. Persons as of 1978. Noninstitutional population 14 years and over excluding members of the Armed Forces living in barracks)

Income	All women	Women of Spanish origin					Women not of Spanish origin ²
		Total	Mexican	Puerto Rican	Cuban	Other Spanish ¹	
Total women, 14 years and over.	87,399	4,212	2,398	650	289	875	83,187
Total women with income.....	65,407	2,780	1,541	424	217	598	62,627
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
\$1 to \$999 or loss.....	14.6	15.4	17.5	7.4	12.3	16.9	14.6
\$1,000 to \$1,999.....	13.0	13.8	15.8	9.2	14.2	11.5	12.9
\$2,000 to \$2,999.....	12.5	12.5	12.4	13.4	17.5	10.2	12.5
\$3,000 to \$3,999.....	10.5	11.8	11.1	17.5	10.7	9.9	10.3
\$4,000 to \$4,999.....	7.9	10.0	9.2	14.7	8.1	9.5	7.8
\$5,000 to \$6,999.....	12.9	15.2	14.7	17.3	18.4	14.2	12.8
\$7,000 to \$7,999.....	5.1	4.9	3.9	5.9	4.3	6.9	5.1
\$8,000 to \$9,999.....	8.4	7.5	7.1	7.4	4.1	10.0	8.4
\$10,000 to \$14,999.....	10.7	7.0	6.7	6.3	6.6	8.4	10.9
\$15,000 to \$24,999.....	3.8	1.7	1.3	1.0	3.1	2.2	3.9
\$25,000 and over.....	0.6	0.2	0.1	0.1	0.7	0.3	0.6
Median income.....	\$3,941	\$3,669	\$3,351	\$4,179	\$3,414	\$4,158	\$3,956

¹Includes Central or South American and other Spanish origin.

²Includes women who did not know or did not report on origin.

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table 14-9. Median Earnings of All Civilian Female Workers and Civilian Female Workers of Spanish Origin, by Occupation and Class of Worker of Longest Job: 1977

(Persons 14 years and over as of 1978. Civilian noninstitutional population. For meaning of symbols, see text)

Occupation and class of worker	All women		Women of Spanish origin		Women not of Spanish origin ¹	
	Number (thousands)	Median earnings	Number (thousands)	Median earnings	Number (thousands)	Median earnings
Total women, 14 years and over with earnings.....	46,194	\$4,674	2,027	\$4,122	44,167	\$4,703
OCCUPATION OF WORKER						
Professional, technical, and kindred workers.....	6,826	9,161	160	8,854	6,666	9,170
Managers and administrators, except farm.....	2,620	7,817	64	(B)	2,556	7,788
Sales workers.....	3,281	2,425	101	3,045	3,180	2,415
Clerical and kindred workers.....	15,095	6,053	555	5,152	14,539	6,090
Craft and kindred workers.....	761	5,600	32	(B)	729	5,533
Operatives, including transport.....	5,421	5,109	512	4,776	4,908	5,145
Laborers, except farm.....	588	2,857	35	(B)	553	2,948
Farmers and farm managers.....	93	758	1	(B)	92	751
Farm laborers and supervisors.....	501	849	75	982	426	829
Service workers, except private household.....	8,996	2,463	394	2,688	8,602	2,456
Private household workers.....	2,012	736	99	1,004	1,914	726
CLASS OF WORKER						
Private wage or salary workers.....	35,099	\$4,463	1,661	\$4,170	33,437	\$4,479
Government wage or salary workers.....	8,981	6,758	330	4,343	8,651	6,846
Self-employed workers.....	2,003	1,677	35	(B)	1,968	1,697
Unpaid family workers.....	112	867	1	(B)	110	874

¹Includes women who did not know or did not report on origin.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 339; and Series P-60, No. 119.

Table 14-10. Poverty Status of Families With Female Householder, No Husband Present, and Female Unrelated Individuals, by Age, for All Women and Women of Spanish Origin: 1977

(Numbers in thousands. Families and unrelated individuals as of 1978. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

Age and family status	Total			Spanish origin		
	Total	Below poverty level		Total	Below poverty level	
		Number	Percent		Number	Percent
Female family householder, no husband present.....	8,236	2,610	31.7	561	301	53.6
14 to 24 years.....	795	522	65.7	68	51	(B)
25 to 34 years.....	2,053	877	42.7	198	127	64.0
35 to 44 years.....	1,858	601	32.4	116	57	49.0
45 to 54 years.....	1,414	296	20.9	110	46	41.7
55 to 64 years.....	953	154	16.2	36	13	(B)
65 years and over.....	1,164	159	13.7	33	7	(B)
Female unrelated individuals...	13,105	3,419	26.1	358	127	35.3
14 to 34 years.....	3,629	828	22.8	145	45	31.0
35 to 54 years.....	1,677	361	21.5	82	19	23.2
55 years and over.....	7,799	2,230	28.6	131	63	48.1

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 339; and Series P-60, No. 119.

Table 14-11. Victimization Rates for Crimes Against Women, by Spanish Origin and Age: 1977

(Rate is number of victimizations per 1,000 persons 12 years and over. Noninstitutional population excluding members of the Armed Forces living in barracks. For meaning of symbols, see text)

excluding members of the armed forces										
Origin and age	All women (thou- sands)	Crimes of violence								Crimes of theft
		Total	Rape	Robbery			Assault			
				Total	With injury	Without injury	Total	Aggra- vated	Simple	
SPANISH ORIGIN WOMEN										
Total, 12 years and over.....	4,427	31.6	3.5	4.1	¹ 1.8	2.3	23.9	5.4	18.5	83.5
12 to 15 years.....	519	32.2	¹ 4.8	-	-	-	27.5	¹ 6.9	20.6	62.1
16 to 19 years.....	530	40.6	¹ 9.8	¹ 4.9	-	¹ 4.9	25.9	¹ 10.0	¹ 15.9	111.8
20 to 24 years.....	609	47.3	¹ 6.6	¹ 6.4	¹ 6.4	-	34.3	¹ 6.1	28.2	110.1
25 to 34 years.....	984	31.1	¹ 2.6	¹ 5.1	-	¹ 5.1	23.5	¹ 5.1	18.3	119.2
35 to 49 years.....	983	30.6	¹ 1.5	¹ 5.6	¹ 4.2	¹ 1.3	23.6	¹ 5.2	18.4	65.6
50 to 64 years.....	526	¹ 17.8	-	¹ 2.5	-	¹ 2.5	¹ 15.4	¹ 2.6	¹ 12.7	50.9
65 years and over.....	276	¹ 9.6	-	-	-	-	¹ 9.6	-	¹ 9.6	² 9.2
WOMEN NOT OF SPANISH ORIGIN ²										
Total, 12 years and over.....	86,269	22.0	1.5	3.9	1.4	2.5	16.6	4.9	11.7	87.7
12 to 15 years.....	7,320	36.1	2.5	4.7	¹ 1.0	3.7	28.9	6.6	22.3	131.5
16 to 19 years.....	7,770	44.0	5.0	5.8	1.7	4.1	33.1	8.9	24.2	135.8
20 to 24 years.....	9,315	39.6	2.7	5.6	2.2	3.4	31.4	10.2	21.3	133.6
25 to 34 years.....	15,710	29.6	1.7	4.0	1.7	2.3	23.8	7.2	16.6	111.3
35 to 49 years.....	16,980	14.3	0.7	3.1	0.7	2.4	10.6	3.4	7.2	86.8
50 to 64 years.....	16,284	8.9	¹ 0.1	3.4	1.1	2.3	5.3	1.8	3.5	51.0
65 years and over.....	12,891	5.3	¹ 0.2	2.9	1.9	1.0	2.2	0.9	1.3	19.2

¹Estimate, based on 10 or fewer sample cases, is statistically unreliable.

²Includes women who did not know or did not report on origin.

Source: U.S. Department of Justice, Law Enforcement Assistance Administration, unpublished 1977 National Crime Survey data.



Appendix A

Definitions and Explanations

Most of the statistics in this report are from the Bureau of the Census, but some data are from other government agencies. Specific sources are cited below each table. The majority of the data are based on the Current Population Survey (CPS). Some data, particularly those in chapter 13, are based on the 1970 census. Census data are not entirely comparable with CPS data because of differing enumeration procedures and processing techniques.

There have been a few changes in CPS data collection in past years that may have some effect on data comparisons over time. Increases in survey sample size have improved data reliability. For example, in March 1974, the sample consisted of 47,000 housing units; by March 1978, the sample included 56,000 housing units. In addition, beginning with the March 1975 CPS, the Bureau of the Census has utilized a new computer processing system designed to take maximum advantage of the Bureau's expanded computer capabilities. The revised system incorporates many improvements in the procedures used to process the data. Therefore, data beginning with the March 1975 CPS are not entirely comparable with CPS data for earlier years. The new system has had more impact upon the income and poverty measures than on other characteristics. A detailed discussion of the influence of these and other changes on income and poverty data appears in Bureau of the Census, Current Population Reports, P-60, Nos. 105 and 106.

Data collected in the CPS from 1972 through 1978 are also, in some instances, not entirely comparable with data for earlier years because of other CPS revisions. Starting in January 1972, 1970 census-based population controls, metropolitan residence definitions, and other materials were introduced into the sampling and estimation procedures. The major factor affecting comparability at the national level is the introduction of population controls based on the 1970 census. Figures for previous years are tied in with 1960 census-based population controls. Basically, these changes have no substantial impact on summary measures, such as medians and means, or on proportional measures, such as percent distributions and ratios. However, the changes may

have more impact on population levels in various subgroupings or within some particular category. A detailed description of the changes appears in the Bureau of Labor Statistics report, *Employment and Earnings*, Vol. 18, No. 8, February 1972. A general discussion of the historical comparability of labor force and occupational data appears in the Bureau of Labor Statistics report, *Employment and Earnings*, Vol. 26, No. 1, January 1979.

Definitions and explanations for many subjects in this report are presented below. More detailed definitions of terms and other explanatory materials may be found in the specific publications referenced in the table source notes.

Age. The age classification is based on the age of the person at the person's last birthday.

Metropolitan-nonmetropolitan residence. The population residing in standard metropolitan statistical areas (SMSA's) constitutes the metropolitan population. Except in New England, an SMSA is a county or group of contiguous counties which contains at least one city of 50,000 inhabitants or more, or "twin cities" with a combined population of at least 50,000. In addition to the county or counties containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central county. In New England, SMSA's consist of towns and cities rather than counties. The metropolitan population in this report is based on SMSA's as defined in the 1970 census and does not include any subsequent additions or changes.

Central cities. Each SMSA must include at least one central city, and the complete title of an SMSA identifies the central city or cities. If only one central city is designated, then it must have 50,000 inhabitants or more.

Geographic regions. The four major regions of the United States for which data are presented in this report represent groups of States, as follows:

South: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

North Central: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

North and West: This designation refers to the Northeast, North Central, and West regions combined.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants. A household includes the related family members and all the unrelated persons, if any, such as lodgers, foster children, wards, or employees who share the housing unit. A person living alone in a housing unit, or a group of unrelated persons sharing a housing unit as partners, is also counted as a household. The count of households excludes group quarters.

Marital status. The marital status classification identifies four major categories: single, married, widowed, and divorced. These terms refer to the marital status at the time of the enumeration.

The category "married" is further divided into "married, spouse present," "separated," and "other married, spouse absent." A person was classified as "married, spouse present" if the husband or wife was reported as a member of the household, even though he or she may have been temporarily absent on business or on vacation, visiting, in a hospital, etc., at the time of the enumeration. Persons reported as separated included those with legal separations, those living apart with

intentions of obtaining a divorce, and other persons permanently or temporarily separated because of marital discord. The group "other married, spouse absent" includes married persons living apart because either the husband or wife was employed and living at a considerable distance from home, was serving away from home in the Armed Forces, had moved to another area, or had a different place of residence for any other reason except separation as defined above.

Family. The term "family," as used in this report, refers to a group of two or more persons related by blood, marriage, or adoption and residing together; all such persons are considered as members of one family. A household may contain more than one family. A person maintaining a household alone, or with unrelated persons only, is regarded as a household but not as a family. Thus, some households do not contain a family.

In the past, the Census Bureau designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the family (or household). However, the trend toward recognition of equal status of adult members of the family (or household) has made the term "head" increasingly inappropriate in the analysis of family and household data. Therefore, the terms "families maintained by a man" (male householder) or "families maintained by a woman" (female householder) are treated as synonymous with those of male head and female head used in previous reports.

Married couple. A married couple, as defined for census purposes, is a husband and wife enumerated as members of the same household. The married couple may or may not have children living with them. The expression "married-couple" before the term "household" or "family" indicates that the household or family is maintained by a husband and wife.

Own children and related children. "Own" children in a family are sons and daughters, including stepchildren and adopted children, of the householder. "Related" children in a family include own children and all other children in the household who are related to the householder by birth, marriage, or adoption.

Unrelated individuals. Unrelated individuals are persons (other than inmates of institutions) who are not living with any relatives. An unrelated individual may be (1) a person living alone or with nonrelatives only, (2) a lodger or resident employee with no relatives in the household, or (3) a group quarters member who has no relatives living with him/her.

Thus, a widow who occupies her house alone or with one or more other persons not related to her, a roomer not related to anyone else in the housing unit, a private household worker living as a member of the employer's household but with no relatives in the household, and a resident staff member in a hospital living apart from any relatives are all examples of unrelated individuals.

Tenure. A housing unit is "owner occupied" if the owner or co-owner lives in the unit, even if it is mortgaged or not fully paid for. A cooperative or condominium unit is "owner occupied" only if the owner or co-owner lives in it. All other occupied units are classified as "renter occupied," including units rented for cash rent and those occupied without payment of cash rent.

Units in structure. In the determination of the number of units in a structure, all housing units, both occupied and vacant, were counted. The statistics are presented in terms of the number of occupied housing units in structures of specified size, not in terms of the number of residential structures.

Years of school completed. Information on educational attainment applies only to progress in "regular" schools and refers to the highest grade of school completed. Such schools include graded public, private, and parochial elementary and high schools (both junior and senior high), colleges, universities, and professional schools, whether day schools or night schools. Thus, regular schooling is that which may advance a person toward an elementary school certificate or a high school diploma, or a college, university, or professional school degree. Schooling in other than regular schools was counted only if the credits obtained were regarded as transferable to a school in the regular school system.

The median years of school completed is defined as the value which divides the distribution into two equal groups, one having completed more schooling and one having completed less schooling than the median. These medians are expressed in terms of a continuous series of numbers representing years of school completed. For example, a median of 9.0 represents the completion of the first year of high school and a median of 13.0 means completion of the first year of college.

School enrollment. The school enrollment statistics are based on replies to the enumerator's inquiry as to whether the person was enrolled in school. Enumerators were instructed to count as enrolled anyone who had been enrolled at any

time during the current term or school year in any type of graded public, parochial, or other private school in the regular school system. Such schools include nursery schools, kindergartens, elementary schools, high schools, colleges, universities, and professional schools. Attendance may be on either a full-time or part-time basis and during the day or night. Thus, regular schooling is that which may advance a person toward an elementary or high school diploma, or a college, university, or professional school degree. Children enrolled in preprimary programs (i.e., nursery schools and kindergarten) are included in the enrollment figures for "regular" schools.

Persons enrolled in classes which do not require physical presence in school, such as correspondence courses or other courses of independent study, and in training courses given directly on the job, are also excluded from the count of those enrolled in school, unless such courses are being counted for credit at a "regular" school.

College enrollment. The college enrollment statistics are based on replies to the enumerator's inquiry as to whether the person was attending or enrolled in college. Enumerators were instructed to count as enrolled anyone who had been enrolled at any time during the current term or school year, except those who have left for the remainder of the term. Thus, regular college enrollment includes those persons attending a 4-year or 2-year college, university or professional school (such as medical or law school), in courses that may advance the student toward a recognized college or university degree (e.g., BA or MA). Attendance may be either full time or part time during the day or night.

Two-year or four-year colleges. Students enrolled in the first 3 years of college were asked to report whether the college in which they were enrolled was a 2-year college (junior or community college) or a 4-year college or university. Students in the fourth academic year of college or higher were assumed to be in a 4-year college or university.

Labor force and employment status. Information on labor force and employment status generally relates to the population 16 years old and over.

Labor force. Persons are classified as being in the labor force if they were employed, unemployed, or in the Armed Forces during the survey week. The "civilian labor force" is composed of all civilians classified as employed or unemployed.

Not in the labor force. All civilians who are not classified as employed or unemployed are defined as "not in the labor force." This group of persons who are neither employed nor

seeking work includes persons engaged only in own home housework, attending school, or unable to work because of long-term physical or mental illness; persons who are retired or too old to work; seasonal workers for whom the survey week fell in an off season; and the voluntarily idle. Persons doing less than 15 hours unpaid family work are also classified as not in the labor force.

Employed. Employed persons comprise (1) all civilians who, during the specified week, did any work at all as paid employees or in their own business or profession, or on their own farm, or who worked 15 hours or more as unpaid workers on a farm or in a business operated by a member of the family, and (2) all those who were not working but who had jobs or businesses from which they were temporarily absent because of illness, bad weather, vacation, or labor-management dispute, or because they were taking time off for personal reasons, whether or not they were paid by their employers for time off, and whether or not they were seeking other jobs. Excluded from the employed are persons whose only activity consisted of work around the house (such as own home housework, painting or repairing own home) or volunteer work for religious, charitable, and similar organizations.

Unemployed. Unemployed persons are those civilians who had no employment during the survey week but were available for work and (1) had engaged in any specific jobseeking activity within the past 4 weeks, (2) were waiting to be called back to a job from which they had been laid off, or (3) were waiting to report to a new wage or salary job scheduled to start within the following 30 days.

Full- and part-time employment. The data in table 6-7 relate to the actual number of hours worked during the survey week.

Work experience. A person with work experience is one who, during the preceding calendar year, did any work for pay or profit or worked without pay on a family-operated farm or business at any time during the year, on a part-time or full-time basis.

Part-time or full-time jobs. A person is classified as having worked at part-time jobs during the preceding calendar year if he or she worked at jobs which provided 1 to 34 hours of work per week in a majority of the weeks in which he or she worked during the year. The person is classified as having worked at full-time jobs if he or she worked 35 hours or more per week during a majority of the weeks in which he or she worked.

Year-round, full-time worker. A year-round, full-time worker is one who worked primarily at full-time civilian jobs

(35 hours or more per week) for 50 weeks or more during the preceding calendar year.

Occupation and industry. The data on occupation and industry refer to the job held during the survey week. Persons employed at two or more jobs were reported at the job at which they worked the greatest number of hours during the week.

Women-owned businesses. A firm was considered to be women owned if the sole owner or one-half or more of the partners were women. A corporation was classified as women owned if 50 percent or more of the stock was owned by women; the data exclude corporations with more than 10 shareholders, except those which were "closely held."

Income and poverty status

Income. Data on income cover money income only, prior to deduction for taxes, received from such sources as wages or salaries, net income from self-employment, Social Security, dividends, interest, public assistance and welfare, unemployment compensation, government pensions, and veterans payments. (Certain money receipts such as capital gains are not included.) Therefore, money income does not reflect the fact that many families receive part of their income in the form of nonmoney transfers such as food stamps, health benefits, and subsidized housing; that many farm families receive nonmoney income in the form of rent-free housing and goods produced and consumed on the farm; or that nonmoney incomes are also received by some nonfarm residents which often take the form of the use of business transportation and facilities, full or partial payments by business for retirement programs, medical and educational expenses, etc. These elements should be considered when comparing income levels. For a more detailed explanation, see Bureau of the Census, Current Population Reports, Series P-60, No. 118.

Median income. The median income is the amount which divides the distribution into two equal groups, one having incomes above the median and the other having incomes below the median. The medians for families and individuals are based on all families and individuals. The median for persons is based on the distribution of persons with income.

Mean income. The mean income is the amount obtained by dividing the total income of a group by the number of units in that group (families, unrelated individuals, or persons). The means for families are based on all families. The means for persons are based on the number of persons with income.

Computation of constant dollar distributions. The adjustment for price change was made by converting the income distribution for families and unrelated individuals for each year (1967 to 1976) into 1977 dollars on the basis of the change in the Consumer Price Index (CPI). The indices used to make the constant dollar conversions are shown in the table below. In choosing a procedure to make this conversion, no fundamental assumptions concerning income data were made: (1) price changes have the same proportional effect on various income levels and (2) the distribution within each income interval follows a Pareto distribution. The following procedure satisfies these two assumptions.

The first step required the accumulation of the income distribution starting with the highest income interval and accumulating to the lowest income interval. Next, the limits of each income interval were converted into 1977 dollars by adjusting them by a factor representing the change on the basis of that year's price index (1977 = 100). Finally, the number of families and unrelated individuals in each of the detailed class intervals were computed by logarithmic interpolation and then combined into broad income intervals.

Consumer Price Index: 1967 to 1977

(1967 = 100)

Year	CPI
1967	100.0
1968	104.2
1969	109.8
1970	116.3
1971	121.3
1972	125.3
1973	133.1
1974	147.7
1975	161.2
1976	170.5
1977	181.5

Source: U.S. Department of Labor, Bureau of Labor Statistics, *Monthly Labor Review*, December 1978.

Poverty (low-income) classification. Families and persons are classified as being above or below the poverty level using the poverty index adopted by a Federal Interagency Committee in 1969. This index is based on the Department of Agriculture's 1961 Economy Food Plan and reflects the different consumption requirements of families based on

their size and composition, sex and age of the family householder, and farm-nonfarm residence. The poverty thresholds are updated every year to reflect changes in the Consumer Price Index (CPI). The poverty threshold for a nonfarm family of four was \$6,191 in 1977, \$5,500 in 1975, and \$3,968 in 1970. The poverty data exclude inmates of institutions, members of Armed Forces living in barracks, and unrelated individuals under 14 years of age. For a more detailed explanation, see Bureau of the Census, Current Population Reports, Series P-60, No. 119.

Race. Data in chapter 12 of this report are provided for the Black and White populations separately. However, in some tables, data for persons of "other" races are shown in combination with the Black population. The "other" category, as used in chapter 12, includes American Indians, Japanese, Chinese, Filipinos, and all other races except Black and White. Chapter 13 presents data on the American Indian population and on the Asian population. For this report, the Asian population includes Japanese, Chinese, and Filipinos.

In the Current Population Survey, data on race are based on the observation of the enumerator, whereas racial identification in the 1970 census was based primarily on self-identification by respondents.

Persons of Spanish origin. Persons of Spanish origin were identified by a question that asked for self-identification of the person's origin or descent. Respondents were asked to select their origin (or the origin of some other household member) from a "flash card" listing ethnic origins. Persons of Spanish origin, in particular, were those who indicated that their origin was Mexican, Puerto Rican, Cuban, Central or South American, or some other Spanish origin. Persons of Spanish origin may be of any race.

Symbols. A dash (—) represents zero or rounds to zero. The symbol "X" means "not applicable," and the symbol "B" means that the base of the derived figure is less than 75,000. "NA" means "not available." "S" means that the figure does not meet standards of reliability or precision (i.e., has more than 30-percent relative standard error).

Rounded numbers. Individual figures are generally rounded to the nearest thousand without being adjusted to group totals, which are independently rounded; percentages are based on the unrounded numbers. In general, percentages which round to less than 0.5 are treated as zero.

Appendix B

Base Tables

Table B-1. Population, by Metropolitan-Nonmetropolitan Residence, Sex, and Age: 1978 and 1970

(Numbers in thousands. Civilian noninstitutional population. Five-quarter averages centered on April)

Year, sex, and age	United States	Metropolitan areas (SMSA's) ¹			Nonmetropolitan areas		
		Total	In central cities ²	Outside central cities	Total	Urban and rural nonfarm	Rural farm
1978							
Women, all ages.....	110,465	74,297	31,635	42,662	36,168	33,038	3,130
Under 14 years.....	22,949	15,064	6,159	8,905	7,884	7,251	633
14 to 19 years.....	12,303	8,222	3,284	4,938	4,081	3,661	421
20 to 24 years.....	10,008	7,024	3,205	3,820	2,983	2,789	195
25 to 34 years.....	16,894	11,760	4,950	6,810	5,133	4,824	310
35 to 44 years.....	12,318	8,406	3,278	5,128	3,912	3,537	375
45 to 64 years.....	22,666	15,337	6,617	8,718	7,329	6,536	793
65 years and over.....	13,328	8,483	4,142	4,342	4,845	4,441	404
Men, all ages.....	103,002	68,750	28,088	40,662	34,253	30,922	3,331
Under 14 years.....	23,911	15,623	6,299	9,323	8,288	7,623	665
14 to 19 years.....	12,338	8,180	3,178	5,001	4,158	3,680	478
20 to 24 years.....	9,341	6,454	2,822	3,631	2,887	2,650	237
25 to 34 years.....	15,936	11,082	4,601	6,481	4,854	4,538	317
35 to 44 years.....	11,398	7,667	2,861	4,806	3,731	3,358	373
45 to 64 years.....	20,727	14,009	5,660	8,350	6,718	5,883	836
65 years and over.....	9,352	5,735	2,666	3,069	3,617	3,190	427
1970							
Women, all ages.....	103,286	67,308	30,568	36,740	35,977	31,770	4,207
Under 14 years.....	26,899	17,274	7,305	9,969	9,625	8,542	1,082
14 to 19 years.....	11,247	7,188	3,091	4,096	4,059	3,518	541
20 to 24 years.....	8,380	5,702	2,776	2,926	2,679	2,474	204
25 to 34 years.....	12,601	8,430	3,637	4,793	4,172	3,819	352
35 to 44 years.....	11,707	7,811	3,243	4,568	3,896	3,407	489
45 to 64 years.....	21,595	14,128	6,791	7,337	7,467	6,396	1,072
65 years and over.....	10,856	6,775	3,724	3,051	4,080	3,614	466
Men, all ages.....	95,950	61,774	27,095	34,679	34,176	29,714	4,462
Under 14 years.....	27,972	17,807	7,429	10,378	10,165	9,030	1,135
14 to 19 years.....	11,111	6,979	2,909	4,069	4,132	3,496	636
20 to 24 years.....	6,728	4,547	2,215	2,332	2,182	1,943	239
25 to 34 years.....	11,644	7,782	3,366	4,416	3,861	3,532	329
35 to 44 years.....	10,825	7,177	2,920	4,257	3,648	3,191	458
45 to 64 years.....	19,600	12,710	5,762	6,948	6,890	5,759	1,131
65 years and over.....	8,069	4,773	2,494	2,279	3,296	2,762	534

¹Population of the 243 standard metropolitan statistical areas (SMSA's) as defined in 1970 census publications.

²Data for central cities refer to their January 1, 1970, boundaries and exclude areas annexed since 1970.

Note: This table is to be used for direct computation of the standard errors of estimated percentages in table 1-4.

Source: U.S. Department of Commerce, Bureau of the Census, unpublished 1978 and 1970 Current Population Survey data.

Table B-2. Population 16 Years Old and Over, by Age, Sex, and Marital Status: 1976

(Numbers in thousands. Noninstitutional population excluding members of the Armed Forces living in barracks)

Sex and marital status	Total, 16 years and over	16 to 24 years	25 to 34 years	35 to 44 years	45 to 64 years	65 years and over
Women, total.....	80,834	17,888	15,882	11,712	22,603	12,749
Never married.....	15,409	11,254	1,798	551	1,050	756
Married, spouse present.....	47,852	5,607	11,884	9,244	16,443	4,674
Other marital status ¹	17,573	1,027	2,200	1,918	5,110	7,319
Men, total.....	73,260	17,359	15,266	11,107	20,615	8,913
Never married.....	18,821	13,514	2,945	807	1,160	395
Married, spouse present.....	47,865	3,370	11,089	9,299	17,294	6,813
Other marital status ¹	6,574	474	1,233	1,001	2,162	1,704

¹Includes widowed, divorced, and married, spouse absent.

Note: This table is to be used for direct computation of the standard errors of estimated percentages in table 1-5.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 305.

Table B-3. Currently Employed Persons, by Age and Sex: 1977

(Numbers in thousands. Civilian noninstitutional population 17 years and over)

Age	Women	Men
Total, 17 years and over.....	37,340	53,498
17 to 24 years.....	9,148	10,895
25 to 44 years.....	16,108	24,110
45 to 64 years.....	10,904	16,432
65 years and over.....	1,179	2,060

Note: This table is to be used for direct computation of the standard errors of estimated percentages in table 2-5.

Source: U.S. Department of Health, Education, and Welfare, National Center for Health Statistics, Vital and Health Statistics, Series 10, No. 126.

Table B-4. Population 16 Years Old and Over, by Age and Sex: 1977 and 1970

(Numbers in thousands. Persons as of the following year. Civilian noninstitutional population)

Age	Women		Men	
	1977	1970	1977	1970
Total, 16 years and over.....	83,374	73,657	74,814	65,296
16 to 19 years.....	8,288	7,519	8,167	7,361
20 to 24 years.....	9,989	8,723	9,331	7,301
25 to 34 years.....	16,857	12,894	15,896	11,982
35 to 44 years.....	12,285	11,583	11,366	10,713
45 to 54 years.....	11,917	12,080	11,115	11,113
55 to 64 years.....	10,740	9,772	9,769	8,663
65 years and over.....	13,298	11,086	9,170	8,163

Note: This table is to be used for direct computation of the standard errors of estimated percentages in table 7-3.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, No. 141; and U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table B-5. Persons and Workers, by Marital Status and Sex: 1977, 1975, and 1970

(Numbers in thousands. Persons 16 years and over as of the following year. Civilian noninstitutional population. For meaning of symbols, see text)

Work experience, marital status, and sex	1977	1975	1970
PERSONS 16 YEARS AND OVER			
Never married:			
Women.....	16,891	15,409	(NA)
Men.....	20,206	18,737	(NA)
Married, spouse present:			
Women.....	47,906	47,852	44,030
With no own children under 18.....	23,066	(NA)	(NA)
With own children 6 to 17 only.....	13,694	(NA)	(NA)
With own children under 6.....	11,147	(NA)	(NA)
Men.....	47,189	47,095	44,683
Other marital status ¹ :			
Women.....	18,577	17,573	(NA)
Men.....	7,419	6,514	(NA)
WORKERS 16 YEARS AND OVER			
Never married:			
Women.....	11,667	(NA)	(NA)
Men.....	15,832	(NA)	(NA)
Married, spouse present:			
Women.....	26,252	(NA)	(NA)
Men.....	39,735	(NA)	(NA)
Other marital status ¹ :			
Women.....	8,460	(NA)	(NA)
Men.....	5,150	(NA)	(NA)

¹Includes divorced, widowed, and married, spouse absent.

Note: This table is to be used for direct computation of the standard errors of estimated percentages in table 7-4.

Source: U.S. Department of Labor, Bureau of Labor Statistics, Special Labor Force Reports, Nos. 192 and 141; and U.S. Department of Commerce, Bureau of the Census, unpublished 1978 Current Population Survey data.

Table B-6. Noninstitutional Population Excluding Members of the Armed Forces Living in Barracks, by Age and Sex: 1977, 1975, and 1970

(Numbers in thousands. Persons as of the following year)

Age	Women			Men		
	1977	1975	1970	1977	1975	1970
All ages.....	110,238	108,652	¹ 104,248	103,629	102,211	¹ 98,228
Under 14 years.....	22,839	23,670	26,599	23,766	24,651	27,636
14 to 21 years.....	16,468	16,426	¹ 14,986	16,346	16,304	¹ 14,372
22 to 34 years.....	22,691	21,492	18,136	21,858	20,620	17,225
35 to 44 years.....	12,285	11,712	11,583	11,566	11,107	10,995
45 to 54 years.....	11,917	12,156	12,082	11,154	11,296	11,171
55 to 59 years.....	5,792	5,545	5,255	5,239	5,016	4,748
60 to 64 years.....	4,948	4,902	4,518	4,530	4,304	3,916
65 years and over.....	13,298	12,749	11,089	9,170	8,913	8,165

¹Excludes householders and spouses 14 and 15 years old.

Note: This table is to be used for direct computation of the standard errors of estimated percentages in table 9-9.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, Nos. 119, 106, and 81.

Table B-7. Noninstitutional Population Excluding Members of the Armed Forces Living in Barracks, by Sex of Householder: 1977, 1975, and 1970

(Numbers in thousands. Persons as of the following year)

Families and unrelated individuals	1977	1975	1970
FAMILIES			
Persons in families with female householder.....	25,404	23,580	19,673
Householder.....	8,236	7,482	6,002
65 years and over.....	1,164	1,125	1,038
Related children under 18 years.....	11,238	10,622	8,845
Other family members.....	5,930	5,476	4,826
Persons in other families ¹	165,353	167,050	167,019
Householder.....	48,979	48,763	46,119
65 years and over.....	7,048	7,038	6,180
Related children under 18 years.....	51,585	54,129	59,970
Other family members.....	64,790	64,158	60,927
UNRELATED INDIVIDUALS			
Female.....	13,105	11,853	9,511
65 years and over.....	5,680	5,374	4,479
Male.....	10,005	8,381	5,980
65 years and over.....	1,639	1,477	1,411

¹Married-couple families and families with male householder, no wife present.

Note: This table is to be used for direct computation of the standard errors of estimated percentages in table 9-11.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, Nos. 119, 106, and 81.

Table B-8. Civilian Noninstitutional Population of Voting Age, by Sex and Age: 1968 to 1978

(Numbers in thousands. For meaning of symbols, see text)

Sex and age	Congressional election			Presidential election		
	1978	1974	1970	1976	1972	1968
Women, 18 years and over.....	80,181	74,906	64,270	77,591	72,370	62,071
18 to 20 years.....	6,198	6,082	(X)	6,257	5,731	(X)
21 to 24 years.....	8,078	7,298	6,854	7,668	7,156	6,155
25 to 34 years.....	17,162	15,129	12,790	16,237	13,943	12,114
35 to 44 years.....	12,548	11,614	11,628	11,833	11,560	11,926
45 to 54 years.....	11,835	12,231	12,047	12,087	12,180	11,772
55 to 64 years.....	10,841	10,259	9,715	10,550	10,073	9,348
65 to 74 years.....	8,326	7,537	6,671	7,913	7,138	6,451
75 years and over.....	5,194	4,755	4,334	5,046	4,588	4,080
Men, 18 years and over.....	71,465	66,393	56,431	68,957	63,833	54,464
18 to 20 years.....	5,963	5,540	(X)	5,848	5,291	(X)
21 to 24 years.....	7,439	6,800	5,740	7,180	6,434	5,015
25 to 34 years.....	16,210	14,179	11,877	15,295	12,991	11,083
35 to 44 years.....	11,616	10,741	10,762	10,936	10,679	10,979
45 to 54 years.....	11,053	11,337	11,087	11,239	11,195	10,860
55 to 64 years.....	9,703	9,133	8,628	9,418	8,896	8,383
65 to 74 years.....	6,404	5,779	5,253	6,061	5,470	5,122
75 years and over.....	3,078	2,884	2,880	2,981	2,878	2,815

Note: This table is to be used for direct computation of the standard errors of estimated percentages in tables 10-1 and 10-2.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, Nos. 332, 322, 293, 253, 228, and 192.

Table B-9. Number of Women, by Marital Status, Age, and Race: 1978, 1976, and 1970

(Numbers in thousands. Civilian noninstitutional population for 1978 and 1976; resident population for 1970)

Marital status and age	Black			White		
	1978	1976	1970	1978	1976	1970
TOTAL WOMEN						
Total, 18 to 44 years.....	5,280	4,973	4,173	37,334	35,786	31,831
18 and 19 years.....	573	568	457	3,527	3,555	3,155
20 to 24 years.....	1,311	1,227	956	8,521	8,235	7,281
25 to 29 years.....	1,079	1,025	760	7,687	7,650	5,942
30 to 34 years.....	894	797	689	6,881	6,184	5,083
35 to 39 years.....	755	689	653	5,729	5,240	4,965
40 to 44 years.....	667	670	659	4,988	4,922	5,404
WOMEN EVER MARRIED						
Total, 15 to 44 years.....	3,204	3,265	3,075	28,690	28,010	25,561
15 to 17 years.....	13	22	38	209	204	230
18 and 19 years.....	56	73	102	737	813	744
20 to 24 years.....	452	525	539	4,667	4,850	4,723
25 to 29 years.....	705	745	598	6,471	6,620	5,296
30 to 34 years.....	709	672	601	6,360	5,794	4,745
35 to 39 years.....	676	618	589	5,456	4,976	4,698
40 to 44 years.....	593	611	608	4,790	4,753	5,125
NEVER-MARRIED WOMEN						
Total, 18 to 44 years.....	2,089	1,731	1,136	8,853	7,979	6,499
18 and 19 years.....	517	494	355	2,791	2,742	2,411
20 to 24 years.....	860	702	416	3,854	3,385	2,558
25 to 29 years.....	373	280	162	1,216	1,030	646
30 to 34 years.....	185	125	88	521	390	338
35 to 39 years.....	79	71	64	273	263	267
40 to 44 years.....	75	59	51	198	169	279

Note: This table is to be used for direct computation of the standard errors of estimated rates in table 12-7.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 308; and unpublished 1978 Current Population Survey data.

Table B-10. Civilian Noninstitutional Population 16 Years Old and Over, by Age, Race, and Sex: Annual Averages for 1978 and 1970

(Numbers in thousands)

Race and age	1978		1970	
	Women	Men	Women	Men
Black and other races, 16 years and over.	10,646	8,714	8,110	6,773
16 to 19 years.....	1,304	1,219	1,029	963
20 to 24 years.....	1,520	1,235	1,089	868
25 to 34 years.....	2,391	1,885	1,574	1,305
35 to 44 years.....	1,677	1,310	1,426	1,129
45 to 54 years.....	1,431	1,219	1,246	1,054
55 to 64 years.....	1,081	915	889	769
65 years and over.....	1,244	930	855	685
White, 16 years and over.....	73,118	66,462	64,624	57,488
16 to 19 years.....	6,973	6,952	6,341	6,178
20 to 24 years.....	8,521	8,138	7,364	5,982
25 to 34 years.....	14,594	14,142	11,095	10,429
35 to 44 years.....	10,726	10,169	10,252	9,676
45 to 54 years.....	10,450	9,868	10,760	10,000
55 to 64 years.....	9,704	8,731	8,760	7,819
65 years and over.....	12,150	8,463	10,052	7,405

Note: This table is to be used for direct computation of the standard errors of estimated percentages in table 12-12.

Source: U.S. Department of Labor, Employment and Training Administration, and U.S. Department of Health, Education, and Welfare, Office of Human Development, 1978 Employment and Training Report of the President; and U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings, Vol. 26, No. 1.

Table B-11. All Women and Women of Spanish Origin, by Type of Spanish Origin and Age: 1978

(Numbers in thousands. Noninstitutional population 25 years and over excluding members of the Armed Forces living in barracks)

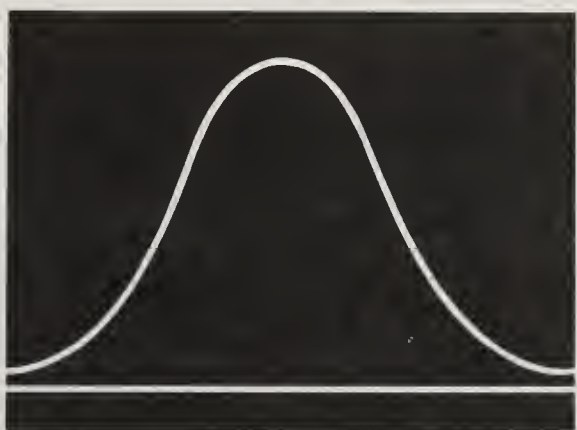
Age	All women	Women of Spanish origin				Women not of Spanish origin ²
		Total	Mexican	Puerto Rican	Other Spanish ¹	
Total women, 25 years and over.....	65,097	2,833	1,530	455	847	62,264
25 to 29 years.....	8,953	553	332	83	138	8,400
30 to 34 years.....	7,904	463	246	102	115	7,441
35 to 44 years.....	12,285	682	356	122	204	11,603
45 to 64 years.....	22,657	850	454	119	277	21,807
65 years and over.....	13,298	286	142	29	114	13,012

¹Includes Cuban, Central or South American, and other Spanish origin.

²Includes women who did not know or did not report on origin.

Note: This table is to be used for direct computation of the standard errors of estimated percentages in table 14-5.

Source: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, No. 339; and unpublished 1978 Current Population Survey data.



Appendix C

Source and Reliability of the Estimates

SOURCE OF DATA

Most of the estimates in this report are based on data from the Bureau of the Census collected in the Current Population Survey (CPS) and the decennial censuses of population. Other data were provided by various Federal agencies including the National Center for Education Statistics, Bureau of Labor Statistics, National Center for Health Statistics, and Department of Justice. The source of data in each table can be found at the bottom of that table. Brief descriptions of the sources and procedures by which data from the Bureau of the Census were obtained are presented below. Sources and procedures for the data provided by other agencies can be obtained from the individual publications referenced in the report.

Current Population Survey (CPS). The CPS data were collected by the Bureau of the Census. Both the Bureau of the Census and the Bureau of Labor Statistics sponsor the survey. The monthly CPS deals mainly with labor force data for the civilian noninstitutional population. Questions relating to labor force participation are asked every month about each member 14 years old and over in each sample household. In addition, supplementary questions are asked in most months about various population characteristics.

Description of the Current Population Survey

Time period	Number of sample areas	Households eligible		Housing units visited, not eligible ¹
		Interviewed	Not interviewed	
August 1972 to present.....	461	45,000	2,000	8,000
Supplemental sample.....	153	8,500	500	1,500
August 1971 to July 1972.....	449	45,000	2,000	8,000
January 1967 to July 1971.....	449	48,000	2,000	8,000

¹These are households which were visited but were found to be vacant or otherwise not eligible for interview.

The present CPS sample was initially selected from the 1970 census file and is updated continuously to reflect new construction where possible (see section, "Nonsampling Variability," below). The monthly CPS sample is spread over 461 areas with coverage in each of the 50 States and the District of Columbia. A supplementary sample of housing units in 24 States and the District of Columbia was incorporated with the monthly CPS sample to produce the 1977 and 1978 data. The expanded CPS sample is located in 614 areas comprising 1,113 counties, independent cities, and divisions in the Nation. The 614 sample areas used include 461 areas from the monthly CPS and 153 supplementary areas.

The table below provides a description of some aspects of the CPS sample designs in use during the reference data collection periods.

The estimation procedure used for the monthly CPS data involves the inflation of weighted sample results to independent estimates of the civilian noninstitutional population of the United States by age, race, and sex. These independent estimates were based on statistics from decennial censuses; statistics on births, deaths, immigration, and emigration; and statistics on the strength of the Armed Forces.

Decennial Census of Population. Decennial census data in this report are based on complete counts or on the samples

associated with the census. Descriptions of samples from the census are found in the appropriate census publications.

Health Interview Survey (HIS). The HIS data were collected by the Bureau of the Census acting as collection agents for the National Center for Health Statistics, Department of Health, Education, and Welfare. HIS utilizes a questionnaire which obtains information on personal and demographic characteristics, illnesses, injuries, impairments, chronic conditions, and other health topics. The population covered by the sample for the HIS is the civilian noninstitutional population of the United States living at the time of the interview. The sample does not include members of the Armed Forces or U.S. nationals living in foreign countries. It should also be noted that the estimates shown do not represent a complete measure of any given topic during the specified calendar period since data are not collected in the interview for persons who died during the reference period. For many types of statistics collected in the survey, the reference period covers the 2 weeks prior to the interview week.

The HIS sample consists of approximately 8,000 segments containing 57,000 assigned households, of which 11,000 were vacant, demolished, or occupied by persons not in the scope of the survey. The 46,000 eligible occupied households yield a probability sample of about 134,000 persons in 44,000 interviewed households in a year.

Annual Housing Survey (AHS). The AHS data were collected in October through December 1976 by the Bureau of the Census, acting as collection agents for the Department of Housing and Urban Development. The sample for this survey was spread over the same 461 PSU's used for CPS. Approximately 72,600 sample housing units (both occupied and vacant) were eligible for interview. Of this number, 3,700 interviews were not obtained because, for occupied housing units, the occupants were not found at home after repeated calls or were unavailable for some other reason, or, for vacant housing units, no informed respondent could be found after repeated visits. In addition to the 72,600, there were also 7,300 sample units which were visited but found not to produce information relevant to the 1976 housing inventory. The AHS estimation procedure was similar to the one used for CPS, except that independent estimates of housing units were employed for AHS.

National Crime Survey (NCS). The NCS data were collected by the Bureau of the Census for the Law Enforcement Assistance Administration of the Department of Justice. Approximately 73,000 housing units were designated for the sample. Interviews were obtained at 6-month intervals from the occupants of about 60,000 units. A majority of the remaining 13,000 units were found to be vacant, demolished, converted to nonresidential use or were otherwise ineligible

for the survey. However, approximately 2,600 of the 13,000 units were occupied by householders who, although eligible to participate in the survey, were not interviewed because they could not be reached after repeated visits, declined to be interviewed, were temporarily absent, or were otherwise not available for interview. Thus, the occupants of about 96 percent of all eligible housing units, or some 137,000 persons, participated in the survey.

Vital Statistics Data. Data on mortality rates are published by the Division of Vital Statistics of the National Center of Health Statistics, Department of Health, Education, and Welfare. Data on number of deaths (numerators of death rates) are gathered from the offices of vital statistics of State governments, with the assistance of the Public Health Service. The denominators of death rates are decennial census figures by age, sex, and race, with adjustments.

RELIABILITY OF CPS ESTIMATES

Since the CPS estimates in this report are based on a sample, they may differ somewhat from the figures that would have been obtained if a complete census had been taken using the same questionnaire, instructions, and enumerators. There are two types of errors possible in an estimate based on a sample survey—sampling and nonsampling. The standard errors provided for this report primarily indicate the magnitude of the sampling error. They also partially measure the effect of some nonsampling errors in response and enumeration but do not measure any systematic biases in the data. The full extent of the nonsampling error is unknown. Consequently, particular care should be exercised in the interpretation of figures based on a relatively small number of cases or on small differences between estimates.

Nonsampling variability. As in any survey work, the results are subject to errors of response and nonreporting in addition to sampling variability. Nonsampling errors can be attributed to many sources, e.g., inability to obtain information about all cases in the sample, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, inability to recall information, errors made in collection such as in recording or coding the data, errors made in processing the data, errors made in estimating values for missing data, and failure to represent all units within the sample (undercoverage).

Undercoverage in the CPS results from missed housing units and missed persons within sample households. Overall undercoverage, as compared to the level of the decennial census, is about 5 percent. It is known that CPS undercoverage varies with age, sex, and race. Generally, undercoverage is larger for males than for females and larger for Blacks and other races than for Whites.

Ratio estimation to independent age-sex-race population controls, as described previously, partially corrects for the bias due to survey undercoverage. However, biases exist in the estimates to the extent that missed persons in missed households or missed persons in interviewed households have different characteristics than interviewed persons in the same age-sex-race group. Further, the independent population controls used have not been adjusted for undercoverage in the 1970 census, which was estimated at 2.5 percent of the population with similar undercoverage differentials by age, sex, and race as are observed in CPS.

The approximate magnitude of two sources of undercoverage of housing units is known. Of the 83,000,000 housing units in the United States, about 600,000 new construction housing units other than mobile homes are not represented in the CPS sample because they were assigned building permits prior to January 1970, but construction was not completed by the time of the census (i.e., April 1970). Conventional new construction for which building permits were issued after 1969 is represented. About 290,000 occupied mobile homes are not represented in CPS; these units were either missed in the census or have been built or occupied since the census. These estimates of missed units are relevant to the present sample only and not to earlier designs where the extent of undercoverage was generally less. The extent of other sources of undercoverage of housing units is unknown but believed to be small.

Sampling variability. The standard errors given in the following tables are primarily measures of sampling variability, that is, of the variation that occurred by chance because a sample rather than the entire population was surveyed. The sample estimate and its estimated standard error enable one to construct confidence intervals, ranges that would include the average results of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions and using the same sample design, and an estimate and its estimated standard error were calculated from each sample, then:

Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.

Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.

Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

The average estimate derived from all possible samples is or is not contained in any particular computed interval. However, for a particular sample, one can say with a specified confidence that the average estimate derived from all possible samples is included in the confidence interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase "some evidence") have a level of significance between 1.6 and 2.0 standard errors.

Note when using small estimates. Summary measures such as medians, rates, and percent distributions are shown in the report only when the base is 75,000 or greater. Because of the large standard errors involved, there is little chance that summary measures would reveal useful information when computed on a smaller base. Estimated numbers are shown, however, even though the relative standard errors of these numbers are larger than those for corresponding percentages. These smaller estimates are provided primarily to permit such combinations of the categories to serve each data user's needs.

Comparability with other data. Data obtained from the CPS and other governmental sources are not entirely comparable. This is due in large part to differences in interviewer training and experience and in differing survey processes. This is an additional component of error not reflected in the standard error tables. Therefore, caution should be used in comparing results between these different sources.

Caution should also be used in comparing CPS estimates from 1977 and 1978, when the expanded sample was used, to those from 1976 and earlier years. Some relatively large differences in estimates of population in metropolitan and nonmetropolitan areas have been observed between the 461 and the 614 area samples. These differences also have relatively large variances and thus do not provide reliable measures of actual changes in the population.

Standard errors based on survey data. Instructions on the use of and tables of standard errors for estimates and percentages for characteristics pertaining to the total, White, or Spanish population (tables C-1 and C-3) and to Black and other races (tables C-2 and C-4) are presented below. Table C-5 presents factors which are to be applied to the figures in tables C-1 through C-4 to produce standard errors for the various subject matter areas.

Standard errors for data based on the decennial census. Sampling errors of all data from the samples of the 1970 Decennial Census shown in this report are small enough to be disregarded.

Standard errors for data based on vital statistics. Since sample statistics are not involved in the numerator or denominator of any vital rate (mortality), the standard errors for such rates are zero.

Standard error tables and their use. In order to derive standard errors that would be applicable to a large number of estimates and could be prepared at a moderate cost, a number of approximations were required. Therefore, instead of providing an individual standard error for each estimate, generalized sets of standard errors are provided for various types of characteristics. As a result, the sets of standard errors provided give an indication of the order of magnitude of the standard error of an estimate rather than the precise standard error.

Standard errors for intermediate values not shown in tables C-1 through C-4 may be approximated by linear interpolation. Estimated standard errors for specific characteristics cannot be obtained from these tables without the use of factors in table C-5. These factors must be applied to the generalized standard errors in order to adjust for the combined effect of sample design and estimating procedure on the value of the characteristic. For example, to produce approximate standard errors for total or White estimates for poverty persons, multiply the appropriate figures in table C-1 or C-3 by the factor, 1.7. The factors for families and householders should be used for items which can typically appear only once in a given household, e.g., "number of householders" or "number of female householders." Table C-8 shows standard errors for children ever born per 1,000 women.

Two parameters are used (denoted "a" and "b") to calculate standard errors for each type of characteristic; they are presented in tables C-6 and C-7. These parameters were used to calculate the standard errors in tables C-1 through C-4 and to calculate the factors in table C-5. They also may be used to directly calculate the standard errors for estimated numbers and percentages. Direct computation of the standard errors will give more accurate results than the use of the standard error tables. Methods for direct computation are given in the following sections.

Standard errors of estimated numbers. The approximate standard error, σ_x , of an estimated number shown in this report can be obtained in two ways. It may be obtained by use of the formula

$$\sigma_x = f\sigma \quad (1)$$

where f is the appropriate factor from table C-5, and σ is the standard error on the estimate obtained by interpolation from tables C-1 and C-2. Alternatively, standard errors may be approximated by formula (2), from which the standard errors were calculated in tables C-1 and C-2. Use of this

formula will provide more accurate results than the use of formula (1).

$$\sigma_x = \sqrt{ax^2 + bx} \quad (2)$$

Here x is the size of the estimate and a and b are the parameters in tables C-6 and C-7 associated with the particular type of characteristic.

Standard errors of estimated percentages. The reliability of an estimated percentage, computed using sample data for both numerator and denominator, depends upon both the size of the percentage and the size of the total upon which the percentage is based. Estimated percentages are relatively more reliable than the corresponding estimates of the numerators of the percentages, particularly if the percentages are 50 percent or more. When the numerator and denominator of the percentage are in different categories, use the factor or parameters indicated by the numerator. The approximate standard error, $\sigma_{(x,p)}$, of an estimated percentage can be obtained by use of the formula

$$\sigma_{(x,p)} = f\sigma \quad (3)$$

In this formula, f is the appropriate factor from table C-5, and σ is the standard error on the estimate from tables C-3 or C-4. Alternatively, standard errors may be approximated by the following formula (4), from which standard errors in tables C-3 and C-4 were calculated; direct computation will give more accurate results than use of the standard error tables and the factors.

$$\sigma_{(x,p)} = \sqrt{\frac{b}{x} p (100 - p)} \quad (4)$$

Here x is the size of the subclass of persons, families, households, or householders which is the base of the percentage, p is the percentage ($0 \leq p \leq 100$), and b is the parameter in tables C-6 and C-7 associated with the particular type of characteristic in the numerator of the percentage.

Illustration of the use of tables of standard errors. Table 3-4 of this report shows that there were 19,298,000 female householders with no spouse present in 1978. Table C-1 shows the standard error on an estimate of this size to be approximately 179,000. Applying the appropriate factor from table C-5 and using formula (1), the approximate standard error is $0.8 \times 179,000 = 143,000$. The 68-percent confidence interval as shown by the data is from 19,155,000 to 19,441,000. Therefore, a conclusion that the average estimate derived from all possible samples lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude with 95-percent confidence that the average estimate derived from all possible samples lies within the interval from 19,012,000 to

19,584,000, i.e., $19,298,000 \pm 2 \times 143,000$. As an alternative, using formula (2) and the parameters $a = -0.000010$, $b = 1389$ from table C-6 gives an estimate of the standard error to be approximately 152,000.

Table 3-4 also shows that of these 19,298,000 female householders with no spouse present, 8,037,000 or 41.6 percent were female householders with families. Table C-6 shows the b parameter for marital status, household, and family characteristics for total or White families or householders is 1389; using formula (4) the standard error, σ_x , on an estimate of 41.6 percent is

$$\sqrt{\frac{1389}{19,298,000}} (41.6)(100-41.6) \doteq 0.4 \text{ percent}$$

Consequently, the 68-percent confidence interval is from 41.2 to 42.0 percent. Therefore, a conclusion that the average estimate derived from all possible samples lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude with 95-percent confidence that the average estimate derived from all possible samples lies within the interval from 40.8 to 42.4 percent, i.e., $41.6 \pm (2 \times 0.4)$ percent. As an alternative, tables C-3 and C-5 and formula (3) can be used to compute an estimated standard error of $0.8 \times 0.5 = 0.4$ percent on the estimate of 41.6 percent.

Standard error of a difference. For a difference between two sample estimates, the standard error is approximately equal to

$$\sigma_{(x-y)} = \sqrt{\sigma_x^2 + \sigma_y^2} \quad (5)$$

where σ_x and σ_y are the standard errors of the estimates x and y ; the estimates can be of numbers, percents, ratios, etc. This will represent the actual standard error quite accurately for the difference between two estimates of the same characteristic in two different areas, or for the difference between separate and uncorrelated characteristics in the same area. If, however, there is a high positive correlation between the two characteristics, the formula will overestimate the true standard error.

Illustration of the computation of the standard error of a difference. Table 3-4 of this report also shows that in 1975, 42.5 percent of the female householders with no spouse present were householders with families. Thus the apparent difference between the percent of female householders with families and no spouse present in 1978 and 1975 is 0.9 percent. Using formula (4) with the base of 16,772,000 and the b parameter from table C-6, the standard error, σ_y , on 42.5 percent is 0.4 percent. Therefore, using formula (5), the standard error of the estimated difference of 0.9 percent is about

$$\sqrt{(0.4)^2 + (0.4)^2} \doteq 0.6 \text{ percent}$$

This means the 68-percent confidence interval around the difference is from 0.3 to 1.5 percent. Therefore, a conclusion that the average difference derived from all possible samples lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly, we could conclude with 95-percent confidence that the average difference derived from all possible samples lies within the interval from -0.3 to 2.1 percent, i.e., $0.9 \pm (2 \times 0.6)$ percent. Since this interval does not exclude negative values, we *cannot* conclude with 95-percent confidence that the percent of female householders, no spouse present, with families in 1978 is actually less than in 1975.

Standard error of a ratio. Certain mean values for persons shown in the tables of this report were calculated as the ratio of two numbers. Standard errors for these means may be approximated as shown below. There are two cases to consider.

Case 1: Estimates of rates where the numerator is a subclass of the denominator: This case applies to prevalence rates or where a unit of the numerator occurs, with few exceptions, only once in the year for any one unit in the denominator. For example, in computing the rate of diabetes per 1,000 population, the numerator consisting of persons with the disease is a subclass of the denominator, which includes all persons in the population. Such rates, if converted to rates per 100, may be treated as though they were percentages. The standard error can be obtained by using the appropriate parameters from table C-7 and using formula (4).

Case 2: Estimates of rates where the numerator is not a subclass of the denominator: This case applies where a unit of the numerator often occurs more than once for any one unit in the denominator. For example, in the computation of the incidence rates for acute conditions per 100 persons, it is possible that a person in the denominator could have sustained more than one acute condition included in the numerator. The approximate standard errors for rates of this kind may be computed as follows:

- (a) Where the denominator is the total U.S. population or includes all persons in one or more of the age-sex-race groups of the total population; the standard error is approximated by the following formula:

$$\sigma\left(\frac{x}{y}\right) = \frac{\sigma_x}{y}$$

The standard error, σ_x , can be obtained by using the appropriate parameters from table C-7 and using formula (2).

- (b) In other cases the standard error of the ratio can be approximated by the following formula:

$$\sigma \left(\frac{x}{y} \right) = \sqrt{\left(\frac{x}{y} \right)^2 \left[\left(\frac{\sigma_y}{y} \right)^2 + \left(\frac{\sigma_x}{x} \right)^2 \right]}$$

The standard errors, σ_y and σ_x , can be obtained by using the appropriate parameters from table C-7 and using formula (2). This formula will overestimate the true standard error if there is a high positive correlation between x and y .

Standard error of a median. This section is provided to enable the user to calculate standard errors for estimated medians when distributions are available. It was impossible to publish all frequency distributions for all income medians in order to calculate standard errors due to lack of space. Distributions, however, can be obtained upon request.

The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure may be used to estimate the 68-percent confidence limits of a median based on sample data.

1. Determine, using the standard error tables and factors or formula (4), the standard error of the estimate of 50 percent from the distribution;
2. Add to and subtract from 50 percent the standard error determined in step (1);

3. Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step (2).

A 95-percent confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step (1).

Illustration of the computation of a confidence interval for a median. Table 14-1 of this report shows that the median age in 1978 of all women of Spanish origin was 22.8 years. Table 14-1 also indicates that the base of the distribution from which this median was determined is 6,196,000 women.

1. Using formula (4) with $b = 4432$, the standard error of 50 percent on a base of 6,196,000 is about 1.3 percent.
2. To obtain a 95-percent confidence interval on an estimated median, add to and subtract from 50 percent twice the standard error found in step (1). This yields percent limits of 47.4 and 52.6.
3. From table 14-1, 44.4 percent were under 20 years of age and 9.9 percent were between 20 and 24 years of age. By linear interpolation, the lower limit on the estimate is found to be about

$$20.0 + (24.0 - 20.0) \left(\frac{47.4 - 44.4}{9.9} \right) = 21.5$$

Similarly, the upper limit may be found by linear interpolation to be about

$$20.0 + (24.0 - 20.0) \left(\frac{52.6 - 44.4}{9.9} \right) = 24.1$$

Thus, the 95-percent confidence interval ranges from 21.5 to 24.1 years.

Table C-1. Standard Errors of Estimated Numbers: Total, White, or Spanish-Origin Population

(68 chances out of 100. Numbers in thousands)

Size of estimate	Standard error	Size of estimate	Standard error
25.....	7	2,500.....	71
50.....	10	5,000.....	100
100.....	14	10,000.....	138
250.....	23	25,000.....	204
500.....	32	50,000 ¹	251
1,000.....	45		

¹For estimates larger than 50,000,000, multiply the estimate by 0.005 to get the standard error.

Note: For a particular characteristic, see table C-5 for the appropriate factor to apply to the above standard errors.

Table C-2. Standard Errors of Estimated Numbers: Black-and-Other-Races Population

(68 chances out of 100. Numbers in thousands)

Size of estimate	Standard error	Size of estimate	Standard error
25.....	8	1,000.....	51
50.....	12	2,500.....	76
100.....	17	5,000.....	96
250.....	26	10,000 ¹	97
500.....	37		

¹For estimates larger than 10,000,000, multiply the estimate by 0.01 to get the standard error.

Note: For a particular characteristic, see table C-5 for the appropriate factor to apply to the above standard errors.

Table C-3. Standard Errors of Estimated Percentages: Total, White, or Spanish-Origin Population

(68 chances out of 100)

Base of estimated percentage (thousands)	Estimated percentage				
	2 or 98	5 or 95	10 or 90	25 or 75	50
75.....	2.3	3.6	5.0	7.2	8.3
100.....	2.0	3.1	4.3	6.2	7.2
250.....	1.3	2.0	2.7	3.9	4.5
500.....	0.9	1.4	1.9	2.8	3.2
1,000.....	0.6	1.0	1.4	2.0	2.3
2,500.....	0.4	0.6	0.9	1.2	1.4
5,000.....	0.3	0.4	0.6	0.9	1.0
10,000.....	0.2	0.3	0.4	0.6	0.7
25,000.....	0.13	0.2	0.3	0.4	0.5
50,000.....	0.09	0.14	0.2	0.3	0.3
100,000.....	0.06	0.10	0.14	0.2	0.2

Note: For a particular characteristic, see table C-5 for the appropriate factor to apply to the above standard errors.

Table C-4. Standard Errors of Estimated Percentages: Black-and-Other-Races Population

(68 chances out of 100)

Base of estimated percentage (thousands)	Estimated percentage				
	2 or 98	5 or 95	10 or 90	25 or 75	50
75.....	2.7	4.2	5.8	8.4	9.6
100.....	2.3	3.6	5.0	7.2	8.4
250.....	1.5	2.3	3.2	4.6	5.3
500.....	1.0	1.6	2.2	3.2	3.7
1,000.....	0.7	1.2	1.6	2.3	2.6
2,500.....	0.5	0.7	1.0	1.4	1.7
5,000.....	0.3	0.5	0.7	1.0	1.2
10,000.....	0.2	0.4	0.5	0.7	0.8
25,000.....	0.15	0.2	0.3	0.5	0.5

Note: For a particular characteristic, see table C-5 for the appropriate factor to apply to the above standard errors.

Table C-5. Factors To Be Applied to Tables C-1 Through C-4 to Estimate Standard Errors of Specific Characteristics

Type of characteristic	Factor	Type of characteristic	Factor
CRIME		KINDERGARTEN AND NURSERY SCHOOL ENROLLMENT	
Personal victimization:		All races.....	0.9
All races and Spanish origin.....	0.9		
Sentenced prisoners in State and Federal institutions.....	0.0	MARITAL STATUS, HOUSEHOLD, AND FAMILY	
Statistics from Uniform Crime Report.....	0.0	Persons:	
EDUCATIONAL ATTAINMENT, SCHOOL ENROLLMENT, MAJOR FIELD OF STUDY		Total or White.....	1.3
Total or White.....	1.0	Black and other races.....	1.3
Black and other races.....	1.0	Spanish origin.....	1.5
Spanish origin.....	1.1	Families or householders:	
EMPLOYMENT, LABOR FORCE PARTICIPATION, WORK EXPERIENCE, OCCUPATION, AND INDUSTRY		Total or White.....	0.8
Annual Average		Black and other races.....	0.7
Male (16+ or 20+):		Spanish origin.....	0.8
Total or White.....	0.6	METROPOLITAN-NONMETROPOLITAN RESIDENCE	
Black and other races.....	0.5	Persons:	
Female (16+ or 20+):		Total or White.....	1.0
Total or White.....	0.6	Spanish origin.....	2.1
Black and other races.....	0.5	Families or householders:	
Teenage (16-19) male or female:		Spanish origin.....	1.2
Total or White.....	0.5	MOVERS	
Black and other races.....	0.5	Marital status:	
Monthly Level		All races.....	0.9
Male (16+ or 20+):		Movers within same county, different county, different State:	
Total or White.....	0.9	Total or White.....	1.5
Black and other races.....	0.8	POPULATION DISTRIBUTION	
Spanish origin.....	1.0	Total or White.....	0.0
Female (16+ or 20+):		Black and other races.....	0.0
Total or White.....	0.9	Spanish origin.....	1.5
Black and other races.....	0.7	POVERTY	
Spanish origin.....	0.8	Persons:	
FERTILITY		Total or White.....	1.7
Number of women: All races.....	0.9	Black and other races.....	1.4
Lifetime birth expectations: All races..	1.2	Spanish origin.....	2.1
HOUSING		Families or householders:	
All housing unit characteristics other than for mobile homes and units lacking plumbing.....	0.9	Total or White.....	0.7
Housing units that are mobile homes or are lacking plumbing.....	1.0	Black and other races.....	0.6
INCOME		Spanish origin.....	0.8
Persons:		UNEMPLOYMENT	
Total or White.....	0.9	Annual Average	
Black and other races.....	0.7	Both sexes, male or female:	
Spanish origin.....	1.0	Total or White.....	0.4
Families or householders:		Black and other races.....	0.4
Total or White.....	0.7	Monthly Level	
Black and other races.....	0.6	Both sexes, male or female:	
Spanish origin.....	0.8	Total or White.....	1.0
VOTING		Black and other races.....	0.9
Total or United States:		Spanish origin.....	0.7
Total or White.....	1.1		
Black and other races.....	1.1		
Region or residence:			
All races.....	1.7		

Table C-6. Parameters To Be Used to Calculate Standard Errors of Specific Characteristics

Type of characteristic	Parameters		Type of characteristic	Parameters	
	a	b		a	b
CRIME			KINDERGARTEN AND NURSERY SCHOOL ENROLLMENT		
Personal victimization:			All races.....	-0.000126	1738
All races and Spanish origin.....	-0.000104	1821	MARITAL STATUS, HOUSEHOLD, AND FAMILY		
Sentenced prisoners in State and Federal institutions.....	0.0	0.0	Persons:		
Statistics from Uniform Crime Report.....	0.0	0.0	Total or White.....	-0.000017	3500
EDUCATIONAL ATTAINMENT, SCHOOL ENROLLMENT, MAJOR FIELD OF STUDY			Black and other races.....	-0.000210	5020
Total or White.....	-0.000016	2064	Spanish origin.....	-0.000026	4432
Black and other races.....	-0.000186	2792	Families or householders:		
Spanish origin.....	-0.000015	2285	Total or White.....	-0.000010	1389
EMPLOYMENT, LABOR FORCE PARTICIPATION, WORK EXPERIENCE, OCCUPATION, AND INDUSTRY			Black and other races.....	-0.000087	1255
Annual Average			Spanish origin.....	-0.000020	1422
Male (16+ or 20+):			METROPOLITAN-NONMETROPOLITAN RESIDENCE		
Total or White.....	-0.000011	755	Persons:		
Black and other races.....	-0.000093	755	Total or White.....	-0.000010	2212
Female (16+ or 20+):			Spanish origin.....	-0.000044	8917
Total or White.....	-0.000008	663	Families or householders:		
Black and other races.....	-0.000065	663	Spanish origin.....	-0.000039	2844
Teenage (16-19) male or female:			MOVERS		
Total or White.....	-0.000043	603	Marital status:		
Black and other races.....	-0.000288	603	All races.....	-0.000026	1826
Monthly Level			Movers within same county, different county, different State:		
Male (16+ or 20+):			Total or White.....	-0.000021	4541
Total or White.....	-0.000025	1798	POPULATION DISTRIBUTION		
Black and other races.....	-0.000221	1798	Total or White.....	0.0	0.0
Spanish origin.....	-0.000027	1863	Black and other races.....	0.0	0.0
Female (16+ or 20+):			Spanish origin.....	-0.000026	4432
Total or White.....	-0.000019	1541	POVERTY		
Black and other races.....	-0.000152	1541	Persons:		
Spanish origin.....	-0.000018	1381	Total or White.....	-0.000030	6134
FERTILITY			Black and other races.....	-0.000209	5539
Number of women: All races.....	-0.000064	1698	Spanish origin.....	-0.000044	8917
Lifetime birth expectations: All races..	-0.000006	3096	Families or householders:		
HOUSING			Total or White.....	-0.000008	1063
All housing unit characteristics other than for mobile homes and units lacking plumbing.....	-0.000019	1517	Black and other races.....	-0.000064	922
Housing units that are mobile homes or are lacking plumbing.....	-0.000027	2196	Spanish origin.....	-0.000020	1422
INCOME			UNEMPLOYMENT		
Persons:			Annual Average		
Total or White.....	-0.000007	1533	Both sexes, male or female:		
Black and other races.....	-0.000052	1385	Total or White.....	-0.000003	394
Spanish origin.....	-0.000011	2229	Black and other races.....	-0.000028	453
Families or householders:			Monthly Level		
Total or White.....	-0.000008	1063	Both sexes, male or female:		
Black and other races.....	-0.000064	922	Total or White.....	-0.000015	1971
Spanish origin.....	-0.000014	1422	Black and other races.....	-0.000139	2265
VOTING			Spanish origin.....	-0.000008	1106
Total or United States:					
Total or White.....	-0.000021	2518			
Black and other races.....	-0.000289	3686			
Region or residence:					
All races.....	-0.000052	6242			

Table C-7. Parameters To Be Used to Calculate Standard Errors of Health Statistics

Type of characteristic	Parameters	
	a	b
Time interval since last physician and dental visit.....	0.000063	82321
Persons who made visits.....	0.000004	3021
Incidence of acute conditions:		
1970.....	-0.000103	71383
1977.....	0.000181	54253
Days of restricted activity or bed disability.....	0.000085	482754
Work loss days.....	0.000040	303506
Limitation of activity.....	(X)	3258

(X) Not applicable.

Note: Because of lack of space, standard errors for these characteristics are not provided in this report; they may be obtained from the individual publications referenced at the bottom of the appropriate tables of this report.

Table C-8. Standard Errors of Children Ever Born Per 1,000 Women

(68 chances out of 100)

Number of women (thousands)	Children ever born per 1,000 women							
	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000
5.....	96	165	233	300	367	434	500	567
10.....	83	143	202	260	318	376	433	491
50.....	51	93	129	164	198	234	274	315
100.....	36	66	92	116	140	166	194	222
500.....	30	54	74	95	114	135	158	181
1,000.....	26	47	64	82	99	117	137	158
5,000.....	18	33	45	58	70	83	97	112
10,000.....	11	20	29	37	44	52	61	70
50,000.....	9	15	20	26	31	38	44	50
100,000.....	7	12	16	21	26	29	35	41
500,000.....	6	11	15	19	23	27	31	35
1,000,000.....	5	9	12	16	20	24	28	32
5,000,000.....	5	8	12	15	19	22	25	29
10,000,000.....	4	8	11	14	17	20	23	27
50,000,000.....	4	7	9	12	15	17	20	22

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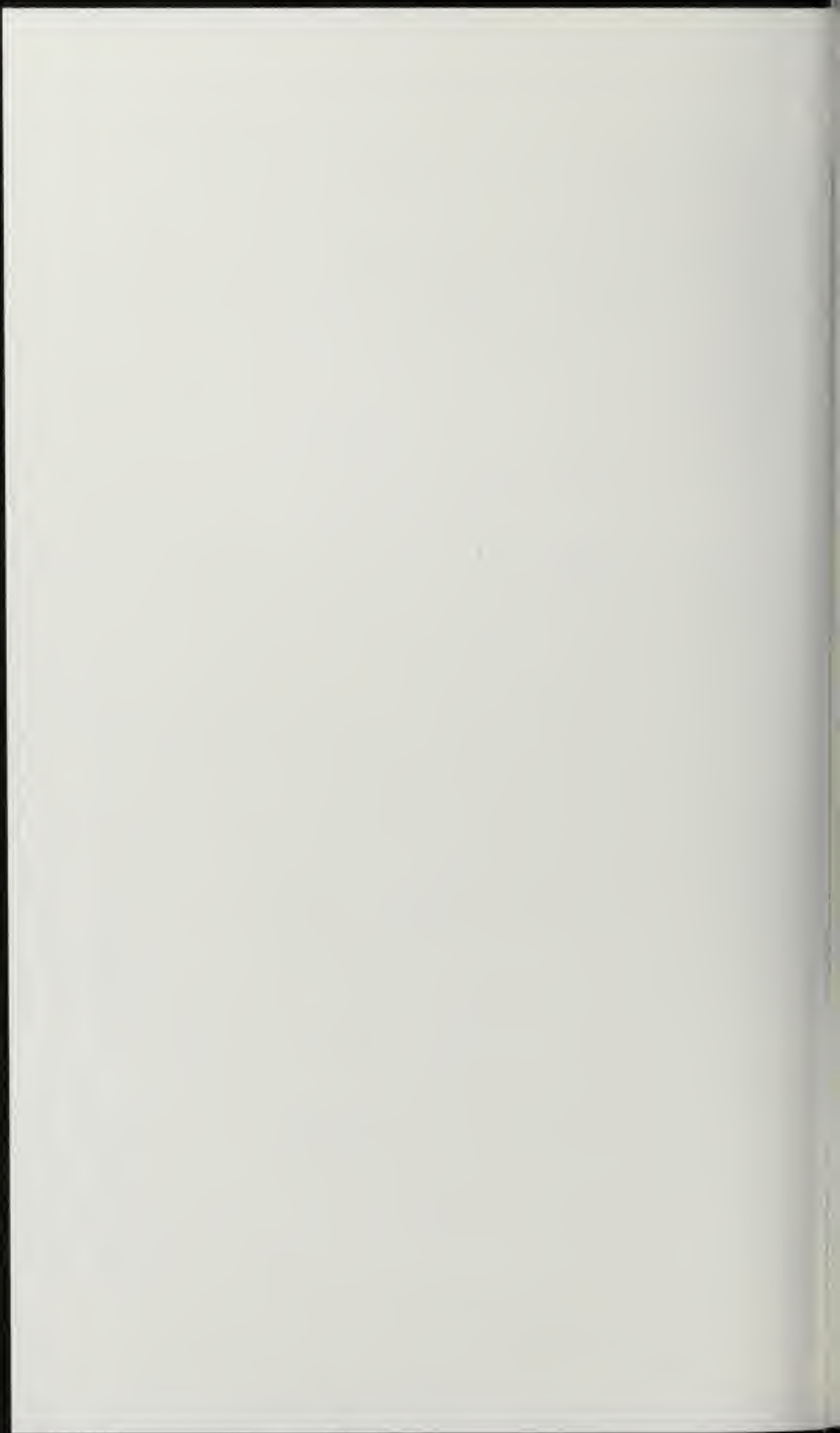
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Issued January 1980



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Library of Congress Cataloging in Publication Data

Spain, Daphne.

Housing successions among Blacks and Whites in cities and suburbs.

(Current population reports : Special studies : Series P-23 ; no. 101)

Supt. of Docs. no.: C 3.186:P23/101

1. Residential mobility—United States.

2. Afro-Americans—Housing. 3. Housing—United States. I. Reid, John Daniel, 1924- joint author. II. Long, Larry H., joint author.

III. Title. IV. Series: United States. Bureau of the Census. Current population reports : Special studies : Series P-23 ; no. 101.

HA203.A218 no. 101 [HB2175] 312'.0973s [307'.2]

79-607911

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Preface

This is another in a series of analytical studies undertaken by demographers of the Bureau of the Census. A distinguishing feature of these occasional publications is that they include broad speculative analysis and illustrative hypotheses by the authors as an aid in understanding the statistics and assessing their potential impact on public policy. The usual scope of these studies is probably broader than that of annual census reports on population subjects but not as complete as book-length monographs.

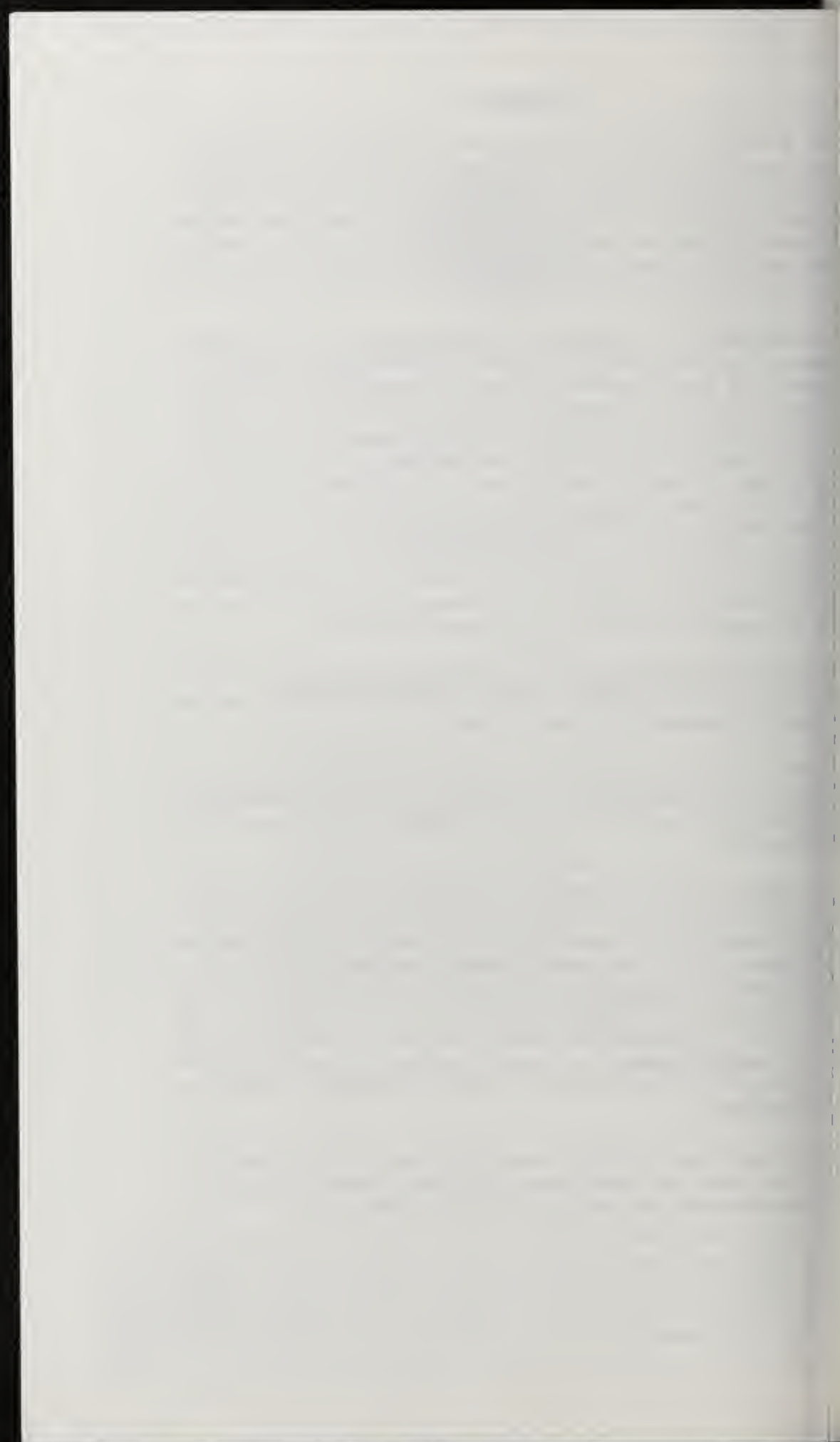
Previous publications in the analytical series include: *Some Recent Changes in American Families*, by Paul C. Glick (1975); *The Geographical Mobility of Americans: An International Comparison*, by Larry H. Long and Celia G. Bartlein (1976); *Marrying, Divorcing, and Living Together in the U.S. Today*, by Paul C. Glick and Arthur J. Norton (1977, published by the Population Reference Bureau, Washington, D.C.); *Racial Succession in Individual Housing Units*, by Larry H. Long and Daphne Spain (1978); *Interregional Migration of the Poor: Some Recent Changes*, by Larry H. Long (1978); *The Future of the American Family* by Paul C. Glick (1979); *Prospective Trends in the Size and Structure of the Elderly Population, Impact of Mortality Trends, and Some Implications*, by Jacob S. Siegel, (1979); and *Reasons for Interstate Migration: Sex, Retirement, Climate, and Other Influences*, by Larry H. Long and Martin A. Hansen (1979). Additional studies are in preparation.

The authors are currently members of the Center for Demographic Studies. Work on the study was initially undertaken in Population Division and was almost entirely supported by Population Division.

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Housing Successions Among Blacks and Whites in Cities and Suburbs

One of the major urban trends in the United States since World War II has been a rise in the percent Black in large cities and a general deterioration of the economic position of cities relative to their suburbs (e.g., Schnore, 1972; Long, 1975). But recently there have been indicators that the potential for halting or even reversing these trends exists. Numerous examples have been cited recently concerning the movement of relatively young, middle-class Whites into neighborhoods that are predominantly Black and/or of lower income status than that of the in-movers (Black et al., 1977; Bradley, 1978; National Urban Coalition, 1978). The process has been described by many names, perhaps most commonly as the "back to the city movement" (Peirce, 1977, 1978; Lamer, 1978) and "gentrification" (U.S. News and World Report, 1979; Fleetwood, 1979; Newsweek 1979). The suggestion is that in large cities an increased number of housing units are not only passing from Black to White occupancy, but are also "filtering up," reversing the more traditional pattern of housing units to be passed to households of lower income (Lowry, 1960).

There is considerable irony in that recent accounts of middle-class Whites moving back to (or staying in) cities come shortly after stories of alleged extensive "White flight," whereby Whites were thought to be leaving cities at an increased rate as a result of school desegregation decisions and busing plans introduced in the early 1970's (Washington Post, 1978). Both "White flight" and "back to the city" movements could, of course, be occurring simultaneously, with some White households (presumably those with children) departing cities at an accelerating rate as other White households were showing an increasing tendency to take up residence in cities. What is needed is a better way of assessing the net effect of these movements, and one way—as reported in this study—is to examine annual housing successions and identify the incidence of Black-to-White and White-to-Black housing turnovers in cities and suburbs.

The suburbs have received their share of publicity as a result of reports of growing suburbanization of the Black population. The number of Blacks living in the suburbs increased by 34 percent between 1970 and 1977, and the percent Black in the suburban population was thereby raised from 4.6 percent in 1970 to 5.6 percent in 1977; this growing Black presence in the suburbs in the 1970's represents a change from the 1960's (U.S. Bureau of the Census, 1978b; Nelson, 1979). Since Blacks moving from cities to suburbs are of higher socioeconomic status than those remaining in cities (Grier and Grier, 1978; Rose, 1976; Roof and Spain, 1977), increased Black suburbanization could act to increase city-suburb income differences, possibly offsetting to some extent the potential for city-suburb income equalization through increased back-to-the-city movement of middle-class Whites.

These concurrent phenomena, alleged White re-citification along with Black suburbanization, have understandably caused researchers to question the future redistribution of the metropolitan population by race and socioeconomic status (Nelson, 1979; Farley et al., 1978). Indeed, the future composition of city and suburban populations is said to be more subject to change and less predictable than at any time since World War II (von Eckardt, 1979). Decennial censuses can provide periodic readings of how individual neighborhoods in cities and suburbs have changed over a 10-year period, but one way of supplementing the data they provide and at the same time monitoring the processes at work (rather than only the result of such processes) is to examine individual housing successions and compare the in-movers directly with the households they replace. Data of this type could provide a dynamic view—a kind of moving picture—of the changes recorded in the decennial snapshot from censuses.

The preceding discussion suggests that with annual data on housing turnovers, one would expect to detect a rise in the incidence of Black-to-White residential successions in cities and a rise in White-to-Black successions in the suburbs. If "gentrification" is occurring, one would, in addition, expect to find a rise in the socioeconomic status of Whites relative to the Black households they are replacing in central cities. Other indicators of central-city revival might include smaller households and younger ages among the Whites who replace Blacks.

Source of Data

In order to create data on housing turnovers, we matched the Annual Housing Surveys conducted by the Census Bureau for the Department of Housing and Urban Development from 1973 through 1976. Each of these four surveys was nationwide in scope, was taken over a 3-month period in the fall of the year, and interviewed about 60,000 households (see U.S. Bureau of the Census, 1978a). The survey was designed to visit the same housing units each year, with the sample being periodically supplemented to reflect new construction and the loss of housing units through conversions and demolitions. We linked three pairs of years (1973-74, 1974-75, and 1975-76) in order to compare the in-moving household with the out-moving household being replaced. In this way, the data were limited to housing units occupied on each of two interview dates a year apart.

A household was considered to have moved out if no member of the household interviewed in one year was present at the time of the next interview a year later. This concept of what constitutes a "housing succession" is the same as used in an earlier study which employed overlapping panels of the Current Population Survey to study household successions in 1967-68, 1968-69, 1969-70, and 1970-71 (Long and Spain, 1978). In both the earlier study and the present study, household successions were classified according to the race of the household head, who was defined according to traditional practice used by the Census Bureau (1978a, appendix p. 19).

Not every sequence of housing successions is recorded by this procedure, however. When renovation is taking place, a housing unit initially occupied

might not be occupied while repairs are being made and could be classified as "vacant" when the interviewer came for the next interview. With interviews a year apart, a sequence of occupied-vacant-occupied would not appear in the year-by-year matches created for this and the earlier study. One should also take note of the fact that in comparing housing units occupied by different households a year apart, one is not always comparing the inmoving household that directly replaced the earlier residents; clearly, there could be intervening movers who occupied the unit between the two interview dates, but the intervening movers would not be picked up in the data.

The results should thus be regarded as tentative. The matching of successive surveys is a fairly new procedure, and the purpose is to attempt to develop a new statistical resource out of existing surveys. If successful, the results would offer a means of monitoring changes as they occur and anticipating future alterations in the make-up of city and suburban population categories.

Black-to-White Successions in Central Cities

The basic results of the matching procedure for 1973-1974, 1974-75, and 1975-76 are shown in table 1 for central cities of standard metropolitan statistical areas (SMSA's) of the United States. Central cities, in this case, reflect their 1970 boundaries and generally have at least 50,000 population. SMSA's are defined as of 1970. We also aggregated the data for the entire 1973-76 period and these data are shown in the appendix along with data for the 1967-71 period used in the earlier study (Long and Spain, 1978).

Table 1. The Incidence of Racial Successions in Housing Units in Central Cities of SMSA's: Single Years, 1973-76

Type of racial succession	1973-74	1974-75	1975-76
NUMBER OF CASES.	2,161	2,221	2,354
Whites replacing Whites	1,611	1,605	1,727
Blacks replacing Blacks.	280	295	296
Blacks replacing Whites.	114	141	104
Whites replacing Blacks.	43	56	94
Successions involving other races	113	124	133
PERCENTAGE DISTRIBUTION	100.0	100.0	100.0
Whites replacing Whites	74.5	72.3	73.4
Blacks replacing Blacks.	13.0	13.3	12.6
Blacks replacing Whites.	5.3	6.3	4.4
Whites replacing Blacks.	2.0	2.5	4.0
Successions involving other races	5.2	5.6	5.6

What appears to be year-to-year fluctuations in table 1 may reflect not only the sampling variability associated with the relatively small number of observations, but may also be the product of various exogenous influences like annual changes in the rate of construction of new housing units, the mix of new construction between single-family houses and apartments, the availability of mortgage money, and other factors that affect year-to-year changes in the supply and demand for new and formerly occupied housing units in cities and suburbs. How those forces affect the number and patterns of annual housing successions has not been firmly established.

The data provide some evidence of a rise in the number and incidence of Black-to-White housing successions in central cities. As can be seen, Black-to-White housing successions appear to have risen in absolute numbers and from 2.0 percent of all housing successions in 1973-74 to 2.5 percent in 1974-75, then to 4.0 percent in 1975-76. The other types of housing succession (especially White-to-White, Black-to-Black, and White-to-Black) give little evidence of systematic change over the 3-year study period.

Although there is limited evidence to support the expectation of a rise in Black-to-White housing transfers in central cities, it is important to point out that this type of housing succession is still less common than the more traditional White-to-Black successions that have produced rises in the percent Black in the Nation's large cities (Long, 1975). In other words, in the 1973-76 period there was still a net transfer of housing units in central cities from White to Black occupancy, just as there was in the 1967-71 study period (Long and Spain, 1978). In the more recent period (1973-76), for every 100 Black-to-White successions there were about 186 White-to-Black successions.

Even though there is some support for the expectation of a rise in the incidence of Black-to-White housing successions in central cities, such a trend would not, by itself, constitute validation of the gentrification hypothesis. If gentrification is occurring, one would also expect to find a rise in the relative socioeconomic status of White households replacing Black households in central city housing units. In fact, if "displacement" rather than mere "replacement" is occurring, one expects to find the White households moving in to be of higher socioeconomic status than the Black households they replace.

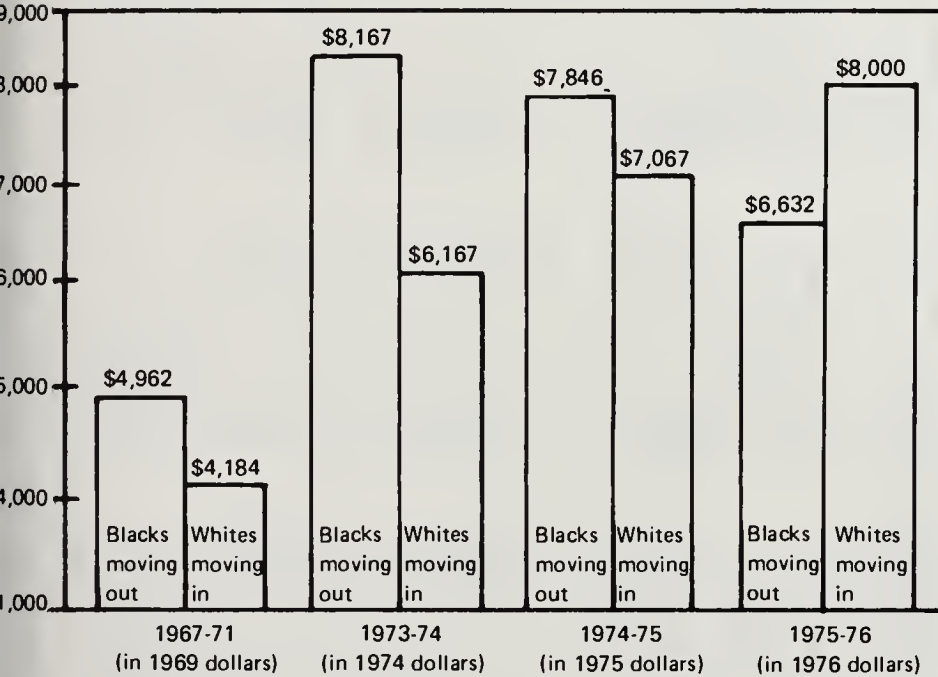
To make this test, we tabulated various socioeconomic characteristics of the households participating in the racial successions shown in table 1. Figure 1 presents a comparison of the annual incomes of White households with the Black households they replaced in central city housing units between 1967 and 1976. Income is for the 12 months preceding the interview.

The results suggest support for the gentrification hypothesis. In 1967-71, the income of White households seemed to be a little less than the Black households they were replacing. During the years from 1974 to 1976, however, the income of White in-mover households appears to be more nearly equal than that of the Black households they replaced in central city housing units. And in

Figure 1.

MEDIAN INCOME OF HOUSEHOLDS INVOLVED IN BLACK-TO-WHITE HOUSING SUCCESSIONS IN CENTRAL CITIES OF SMSA'S: 1967 TO 1976

Median Household Income



1975-76, the White in-movers appear to have had even greater incomes than the Black households being replaced, as predicted by the gentrification hypothesis. But the number of cases is too small to draw definitive conclusions (the number of cases on which figure 1 is based can be found in table 1 and in Long and Spain [1978, p. 6]).

Other data also seem to give support to the gentrification hypothesis. Another measure of socioeconomic status is educational level. In 1967-71, White households replacing Black households in central cities appeared to have lower levels of educational attainment than the Black households being replaced; in that period, about 8.9 percent of White in-mover household heads were found to have completed 4 or more years of college, compared with 11.1 percent of Black heads of households they replaced. By 1975-76, the White in-mover households appeared to have slightly higher educational levels than the Black households they replaced (about 14.9 percent of in-moving White household heads had 4 or more years of college, compared with 13.8 percent for the Black household heads moving out). A higher educational level among the White in-movers would be predicted by the gentrification hypothesis. The educational attainment of movers is shown in table 2 along with other summary demographic and socioeconomic characteristics.

Other views of households thought to be participating in the gentrification process are less clearly supported by the data in table 2. There is little evidence

Table 2. Selected Characteristics of Households Vacating a Housing Unit and the Households That Replace Them in Central Cities of SMSA's: Single Years, 1973-76

Characteristics and year	White households replacing other White households		Black households replacing other Black households		Black households replacing White households		White households replacing Black households	
	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers
1973-74								
Mean household size	2.5	2.5	3.0	2.9	2.6	2.7	2.2	2.5
Median household income (in 1974 dollars)	8,528	8,855	5,842	5,530	7,920	9,680	8,167	6,167
Percent of household heads with 4 or more years of college	(NA)	22.6	(NA)	5.0	(NA)	13.2	(NA)	16.3
Median age of head	31.4	28.9	31.9	29.5	33.8	29.0	28.0	31.6
Husband-wife families as a percent of all mover households	52.2	49.2	37.5	35.7	51.8	48.2	27.9	27.9
Percent moving within same county	(NA)	71.6	(NA)	85.7	(NA)	86.8	(NA)	67.4
Number of cases	1,611	1,611	280	280	114	114	43	43
1974-75								
Mean household size	2.5	2.5	2.9	2.9	2.3	2.7	2.6	2.6
Median household income (in 1975 dollars)	9,182	8,839	6,029	5,268	7,813	7,150	7,846	7,067
Percent of household heads with 4 or more years of college	21.3	22.2	7.1	3.7	17.7	11.3	17.9	16.1
	20.0	20.7	20.6	21.0	20.2	20.4	20.6	20.8

Characteristics and year	White households replacing other White households		Black households replacing other Black households		Black households replacing White households		White households replacing Black households	
	Out- movers	In- movers	Out- movers	In- movers	Out- movers	In- movers	Out- movers	In- movers
1974-75—Continued								
Husband-wife families as a percent of all mover households	47.7 (NA)	49.7	30.5 (NA)	32.2	35.5 (NA)	30.5	35.7 (NA)	42.9
Percent moving within same county .	1,605	70.7	295	87.8	141	80.1	56	66.1
Number of cases		1,605		295		141		56
1975-76								
Mean household size	2.4	2.4	2.8	2.9	2.3	2.8	2.6	2.8
Median household income (in 1976 dollars)	9,046	9,390	5,808	5,600	7,538	8,167	6,632	8,000
Percent of household heads with 4 or more years of college	22.9	24.8	4.7	5.1	14.4	17.3	13.8	14.9
Median age of head	29.8	28.9	32.4	31.3	37.3	28.5	28.7	28.3
Husband-wife families as a percent of all mover households	47.5 (NA)	45.5	27.0 (NA)	29.1	36.5 (NA)	44.2	33.0 (NA)	35.1
Percent moving within same county .	1,727	71.2	296	85.8	104	82.7	94	75.5
Number of cases		1,727		296		104		94

NA means not available.

of systematic differences in age or household size between the inmoving White households and the Black households they replace. Based on case studies and other accounts of housing renovators (e.g., Gale, 1977), one might expect to find a younger age and smaller household size for the inmoving Whites. Instead over the 3-year period from 1973 to 1976, one finds the White households as well as the Black households they replace averaging close to 2.5 persons, with the head around 29 years of age.

Nor is there much evidence to support the idea that Black-to-White housing successions are largely the product of a back-to-the-city movement. In at least two-thirds of the Black-to-White housing successions in central cities between 1973 and 1976, the Whites were moving from elsewhere in the same county. With these data, there is no way to trace where the vacating Black household moved. In general, the data tell us that in most housing successions in central cities—whether Whites replace Whites, Blacks replace Blacks, Blacks replace Whites, or Whites replace Blacks—the inmovers are covering short distances usually moving from one part of the city to another. This was true in the 1967-71 period as well (Long and Spain, 1978, p. 11).

There is at least one other aspect of Black-to-White housing successions that does not conform to the conventional image of gentrification. Black households being replaced by White households do not have appreciably lower incomes than other Black movers in central cities. In fact, Black households being replaced by White households appear to have higher incomes than Black households who are replacing or being replaced by other Black households. Clearly, Black households being replaced by White households are not, on the average, more disadvantaged than other urban Black movers.

As mentioned earlier, the most common form of racial succession in urban housing in the 1973-76 period involved Black households replacing White households. As in the 1967-71 period (Long and Spain, 1978, pp. 10-13), Whites who were replaced by Blacks tended to be older and had lower income than other White movers. Blacks who replaced Whites in urban housing tended to have higher incomes and more often were husband-wife families than were Black movers replacing or being replaced by other Blacks.

The overall picture has aspects of both continuity and change. On the side of continuity, there was still a net transfer of central city housing units in the 1973-76 period from White to Black occupancy, but on the side of change, the size of the net transfer seems to be falling as a result of an apparent rise in the number and proportion of housing turnovers consisting of White households replacing Black households. The latter trend, if indeed it is real, could be a manifestation of gentrification, or it could simply reflect a change in attitude and a decline in the effect of race in the buying, selling, and renting of homes and apartments in cities. Also on the side of change is the apparent tendency for White households replacing Blacks to be a relatively more affluent group than in the past—relative, that is, to the Blacks they replace; the Whites may even have come to have higher incomes, on the average, than the Black households being replaced, as would be expected if gentrification is occurring.

Table 3. The Incidence of Racial Successions in Housing Units in the Balance of SMSA's: Single Years, 1973-76

Type of racial succession	1973-74	1974-75	1975-76
NUMBER OF CASES.	2,145	2,534	2,603
Whites replacing Whites	1,932	2,254	2,318
Blacks replacing Blacks.	62	81	72
Blacks replacing Whites.	48	80	73
Whites replacing Blacks.	38	36	39
Successions involving other races	65	83	101
PERCENTAGE DISTRIBUTION	100.0	100.1	100.1
Whites replacing Whites	90.1	89.0	89.1
Blacks replacing Blacks.	2.9	3.2	2.8
Blacks replacing Whites.	2.2	3.2	2.8
Whites replacing Blacks.	1.8	1.4	1.5
Successions involving other races	3.0	3.3	3.9

Contrary to the notion that gentrification results from a strong back-to-the-city movement, most of the White households replacing Black households were moving from elsewhere in the city.

White-to-Black Successions in the Suburbs

In the suburbs, the attention has been on White-to-Black successions because the percent Black in the suburbs rose from 4.6 percent in 1970 to 5.6 percent in 1977 (U.S. Bureau of the Census, 1978b). This trend is confirmed in table 3, which shows the incidence of racial succession in suburban housing units, just as was done for central cities in table 1.

No steady increase in the incidence of racial succession in housing is apparent in the annual data for 1973-76, but the amount of racial succession in suburban housing seems to be at a higher level than in the earlier study for 1967-71. The percent of housing successions in the suburbs (as defined in 1970) characterized by Blacks replacing Whites is shown to be 2.2 percent in 1973-74, 3.2 percent in 1974-75, and 2.8 percent in 1975-76. In 1967-71 Blacks replacing Whites in suburban housing units constituted only 2.1 percent of all housing successions in the suburbs (as defined in 1960).

The 1973-76 figures mean that out of each 1,000 housing turnovers in the suburbs, 82 units changed from White to Black occupancy, and 47 changed in the opposite direction—from Black to White occupancy. Hence, out of every 1,000 housing successions, there was a net shift of 35 housing units from White to Black occupancy. This figure represents an apparent increase over the 1967-71 period, when every 1,000 housing successions in the suburbs resulted in a net shift of only 15 housing units from White to Black occupancy.

In general, these figures on suburban housing successions show few surprises. They tend to confirm the earlier results and other recent data that show an increase in the suburban Black population in the 1970's. The characteristics of Black suburban movers, as shown in table 4, also tend to confirm past patterns. Blacks in suburbs, regardless of the type of household they replace, have higher incomes and educational levels than Blacks in central cities (table 2). Suburban Black households are more likely than central city Black households to consist of husband-wife couples. Combined with a slightly larger mean household size and slightly lower median age of household head among suburban Blacks, it appears that young Black families with children are still a large part of the Black suburban movement (Long and Spain, 1978).

Housing occupied by Blacks is generally of poorer quality than that occupied by Whites (Spain et al., 1978; Sternlieb and Lake, 1975). Lake's (1979) study of racial transition in suburban housing found that housing units experiencing Black-to-Black transition are older and of lower average value than White-to-White units. He found that units occupied by Blacks which replaced Whites were newer, indicating an upgrading of the Black suburban housing stock. Oddly, however, these newer units had the lowest median value of any type of transition. We have a possible methodological explanation for that, as proposed below.

Although we do not have comparable housing data, the socioeconomic data lend support to Lake's findings. Blacks who replaced Whites in 1975-76 had slightly higher incomes and more education than the previous White occupants, suggesting gradual upgrading of the housing stock. But it seems doubtful that Blacks replacing Whites in the suburbs have incomes much higher than the Whites they replace, because the matching procedure tends to understate somewhat the income of outmovers relative to that of in-movers. The reason is that the income of outmovers (households initially residing in the housing unit) is measured 1 year earlier than that of in-movers (households living in the unit 1 year later). In view of high annual rates of inflation and the 1-year lag between outmovers' income and in-movers' income, perhaps the income of outmovers should be adjusted upward. If this adjustment is made (it is not made in the table), Blacks replacing Whites in suburban housing might have had lower incomes than the Whites being replaced in 1973-74 and 1974-75, an approximately equal income in 1975-76. This might explain how Blacks who replace Whites can upgrade their housing relative to other Blacks, while still having less purchasing power than Whites.

Blacks replacing Whites in the suburbs have higher incomes and more education than Blacks replacing Blacks. The higher socioeconomic status of Blacks replacing Whites further suggests that Blacks are replacing Blacks in older, inner suburbs, while Blacks who replace Whites are on the fringes of newer housing.

For other demographic characteristics, Black in-movers and White out-movers demonstrated similar traits. Households participating in White-to-Black housing successions in the suburbs tend to be roughly similar in age and household size. Because of the small number of observations, few other meaningful comparisons are possible.

Table 4. Selected Characteristics of Households Moving in the Balance of SMSA's: Single Years, 1973-76

Characteristics and year	White households replacing other White households		Black households replacing Black households		Black households replacing other Black households		Black households replacing White households		White households replacing Black households	
	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers
1973-74										
Mean household size	2.8	2.7	2.9	3.3	2.6	2.5	2.9	3.2		
Median household income (in 1974 dollars)	10,777	11,199	6,667	7,538	9,667	9,200	10,000	9,200		
Percent of household heads with 4 or more years of college	(NA)	21.6	(NA)	8.1	(NA)	18.8	(NA)	15.8		
Median age of head	32.4	29.4	30.9	28.6	31.3	30.0	29.2	29.4		
Husband-wife families as a percent of all mover households	62.0	64.3	51.6	40.3	64.6	39.6	57.9	52.6		
Percent moving within same county	(NA)	63.0	(NA)	80.6	(NA)	68.8	(NA)	55.3		
Number of cases	1,932	1,932	62	62	48	48	38	38		
1974-75										
Mean household size	2.7	2.7	2.9	3.1	2.9	3.2	2.1	2.7		
Median household income (in 1975 dollars)	11,046	11,493	7,900	5,661	10,333	8,909	10,000	10,000		
Percent of household heads with 4 or more years of college	20.3	22.4	6.2	9.9	21.3	12.5	8.3	22.2		

Table 4. Selected Characteristics of Households Vacating a Housing Unit and the Households That Replace Them
in the Balance of SMSA's: Single Years, 1973-76 — Continued

Characteristics and year	White households replacing other White households		Black households replacing other Black households		Black households replacing White households		White households replacing Black households	
	Out- movers	In- movers	Out- movers	In- movers	Out- movers	In- movers	Out- movers	In- movers
1974-75—Continued								
Median age of head	31.8	29.5	29.9	29.9	31.6	27.6	31.7	33.8
Husband-wife families as a percent of all mover households	62.9 (NA)	61.6 63.4	32.1 74.1	39.5 (NA)	60.0 (NA)	53.8 58.8	30.6 (NA)	50.0 47.2
Percent moving within same county	2,254	2,254	81	81	80	80	36	36
Number of cases								
1975-76								
Mean household size	2.8	2.7	2.9	3.3	3.1	3.1	2.6	3.0
Median household income (in 1976 dollars)	11,896	12,465	8,118	7,263	12,206	14,028	11,071	11,136
Percent of household heads with 4 or more years of college	21.4	22.5	8.3	8.3	20.5	23.3	17.9	20.5
Median age of head	31.1	29.2	29.5	28.1	30.8	30.8	27.5	29.5
Husband-wife families as a percent of all mover households	62.9 (NA)	62.5 61.0	38.9 (NA)	36.1 73.6	65.8 (NA)	64.4 63.0	51.3 (NA)	64.1 43.6
Percent moving within same county	2,318	2,318	72	72	73	73	39	39
Number of cases								

NA means not available.

Conclusion

The most important results of this report concern White households displacing Black households in central city housing units. As expected, the incidence of housing successions of this type has increased, and, more importantly, there seems to be a rise in the socioeconomic status of Whites relative to the Blacks they replace. There is even a suggestion in the data that in 1976, the income and educational levels of White in-movers exceeded levels of the Black households they replaced. In general, the apparent rise between 1967-71 and 1973-76 observation periods in the income and educational levels of White in-mover households relative to the Black households they replaced in central cities would tend to support numerous case studies and other accounts of gentrification and back-to-the-city/stay-in-the-city trends.

If such a trend were to accelerate, it certainly would carry the potential for vitalizing cities, though perhaps at the expense of displacing low-income households. It could alter in important ways the composition and character of city populations, and by keeping more middle-income households in cities or inducing more to return to city living, a gentrifying trend could bring about a reduction in the city-suburb income gap, which has been widening at least since the 1950's.

But this last effect of gentrification is not now evident, at least not when we consider all central cities taken together. In 1960, the median income of central city families was 89 percent as large as the median income of suburban families, and by 1970, city families had incomes only 84 percent as large as those of suburban families. Since then, the percentage fell further, so that by 1978, central city families had incomes only 79 percent as large as those of suburban families—a continued and somewhat faster widening of the gap. To the degree that gentrification is occurring, it is not yet large enough to halt the decline, let alone to close this income gap. Of course, if data were available for individual cities and suburbs, the cities where gentrification trends are most prevalent might show a narrowing of the city-suburb income difference.

Other city and suburban population trends are continuing at the present rate.

The percent Black in central cities has increased, having risen from 20.5 percent in 1970 to 22.4 percent in 1977 (U.S. Bureau of the Census, 1978b). A contribution of this paper is the demonstration that this pattern results in part from a continued net transfer of central city housing units from White to Black occupancy.

The percent Black in the suburbs has increased, from 4.6 percent in 1970 to 5.6 percent in 1977. As in central cities, this increase in the percent Black resulted in part from a net transfer of housing units from White to Black occupancy.

This study reported on an effort to monitor, more closely than previously possible, the dynamic demographic processes that are at work before they are manifested in the aggregate statistics available from cross-sectional measurements. There is evidence from the study that there is a potential for slowing the rising percent Black in central cities and the widening city-suburb income gap, but for the time being, these two trends are continuing.

Appendix Table 1. Distribution of Annual Housing Successions in Central Cities and the Balance of SMSA's:
1967-71 and 1973-76

Location of housing unit	All household successions	Whites replacing Whites	Blacks replacing Blacks	Blacks replacing Whites	Whites replacing Blacks	Successions involving other races
1967-71						
Number of Cases						
Central cities of SMSA's ¹	3,481	2,661	475	204	45	96
Balance of SMSA's ¹	3,095	2,890	86	65	18	36
Percentage Distribution						
Central cities of SMSA's ¹	100.0	76.4	13.6	5.9	1.3	2.8
Balance of SMSA's ¹	100.1	93.4	2.8	2.1	0.6	1.2
1973-76						
Number of Cases						
Central cities of SMSA's ²	6,736	4,943	871	359	193	370
Balance of SMSA's ²	7,282	6,504	215	201	113	249
Percentage Distribution						
Central cities of SMSA's ²	100.0	73.4	12.9	5.3	2.9	5.5
Balance of SMSA's ²	100.1	89.3	3.0	2.8	1.6	3.4

¹ Reflects SMSA's as defined in 1960.
Reflects SMSA's as defined in 1970.

Appendix Table 2. Selected Characteristics of Households Vacating a Housing Unit and the Households That Replace Them in Central Cities and the Balance of SMSA's: 1967-71

Location and household characteristics	White households replacing other White households		Black households replacing other Black households		Black households replacing White households		White households replacing Black households	
	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers
CENTRAL CITIES OF SMSA's*								
Mean household size	2.7	2.7	3.2	3.0	3.0	3.7	3.4	3.5
Median household income (in 1969 dollars)	6,721	6,823	4,519	4,538	6,370	6,933	4,962	4,184
Percent of household heads with 4 or more years of college	16.6	15.5	4.2	2.5	7.4	6.9	11.1	8.9
Median age of head	36.3	32.1	34.6	33.6	45.6	35.8	36.7	33.1
Husband-wife families as a percent of all mover households	61.8 (NA)	58.8	49.7 (NA)	39.4	63.2 (NA)	59.3	53.3 (NA)	48.9
Percent moving within same county	2,661	71.7	89.2	89.2	204	89.4	45	73.5
Number of cases		2,661	475	475	204	204	45	45

Appendix Table 2. Selected Characteristics of Households Vacating a Housing Unit and the Households That Replace Them in Central Cities and the Balance of SMSA's: 1967-71 — Continued

Location and household characteristics	White households replacing other White households		Black households replacing other Black households		Black households replacing White households		White households replacing Black households	
	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers
BALANCE OF SMSA's*								
Mean household size	3.2	3.1	3.4	3.4	3.2	3.6		
Median household income (in 1969 dollars)	8,542	8,601	4,125	5,192	8,125	8,000		
Percent of household heads with 4 or more years of college	21.2	19.9	4.7	2.3	18.5	10.8		
Median age of head	34.9	32.2	31.5	32.7	46.5	35.8		
Percent of all mover households as a percent of all mover households	74.4	73.5	54.7	50.0	70.8	66.2		
Percent moving within same county	(NA)	62.4	(NA)	82.4	(NA)	70.0		
Number of cases	2,890	2,890	86	86	65	65		

NA means not available.

*Based on 1960 definitions of SMSA's.

Too few cases to show characteristics

Appendix Table 3. Selected Characteristics of Households Vacating a Housing Unit and the Households That Replace Them in Central Cities and the Balance of SMSA's: 1973-76

Location and household characteristics	White households replacing other White households		Black households replacing other Black households		Black households replacing White households		White households replacing Black households	
	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers
CENTRAL CITIES OF SMSA's ¹								
Mean household size	2.5	2.5	2.9	2.9	2.4	2.7	2.5	2.6
Median household income (in 1975 dollars)	9,767	9,913	6,465	6,011	8,519	9,225.	8,326	7,722
Percent of household heads with 4 or more years of college	22.1	23.2	5.9	4.6	16.0	13.9	15.9	15.8
Median age of head	30.7	28.8	32.3	30.6	36.8	29.0	28.8	29.6
Husband-wife families as a percent of all mover households	49.1 (NA)	48.1	31.7 (NA)	32.3	41.3 (NA)	41.0	32.2 (NA)	35.3
Percent moving within same county	4,943	71.2	871	86.4	359	83.2	193	69.7
Number of cases	4,943	4,943	871	871	359	359	193	193

Appendix Table 3. Selected Characteristics of Households Vacating a Housing Unit and the Households That Replace Them in Central Cities and the Balance of SMSA's: 1973-76 — Continued

Location and household characteristics	White households replacing other White households		Black households replacing other Black households		Black households replacing White households		White households replacing Black households	
	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers	Out-movers	In-movers
BALANCE OF SMSA's ¹								
Mean household size	2.8	2.7	2.9	3.2	2.9	2.9	2.5	3.0
Median household income (in 1975 dollars)	12,291	12,848	8,251	7,518	11,694	11,624	11,324	11,056
Percent of household heads with 4 or more years of college	20.9	22.2	7.3	8.8	20.9	18.2	13.1	19.5
Median age of head	31.8	29.4	30.1	28.9	31.2	29.5	29.5	30.9
Husband-wife families as a percent of all mover households	62.6	62.8	43.3	36.2	63.5	52.6	46.6	55.6
Percent moving within same county	(NA)	62.5	(NA)	75.1	(NA)	63.5	(NA)	48.7
Number of cases	6,504	6,504	215	215	201	201	113	113

¹ Based on 1970 definitions of SMSA's.

NA means not available.

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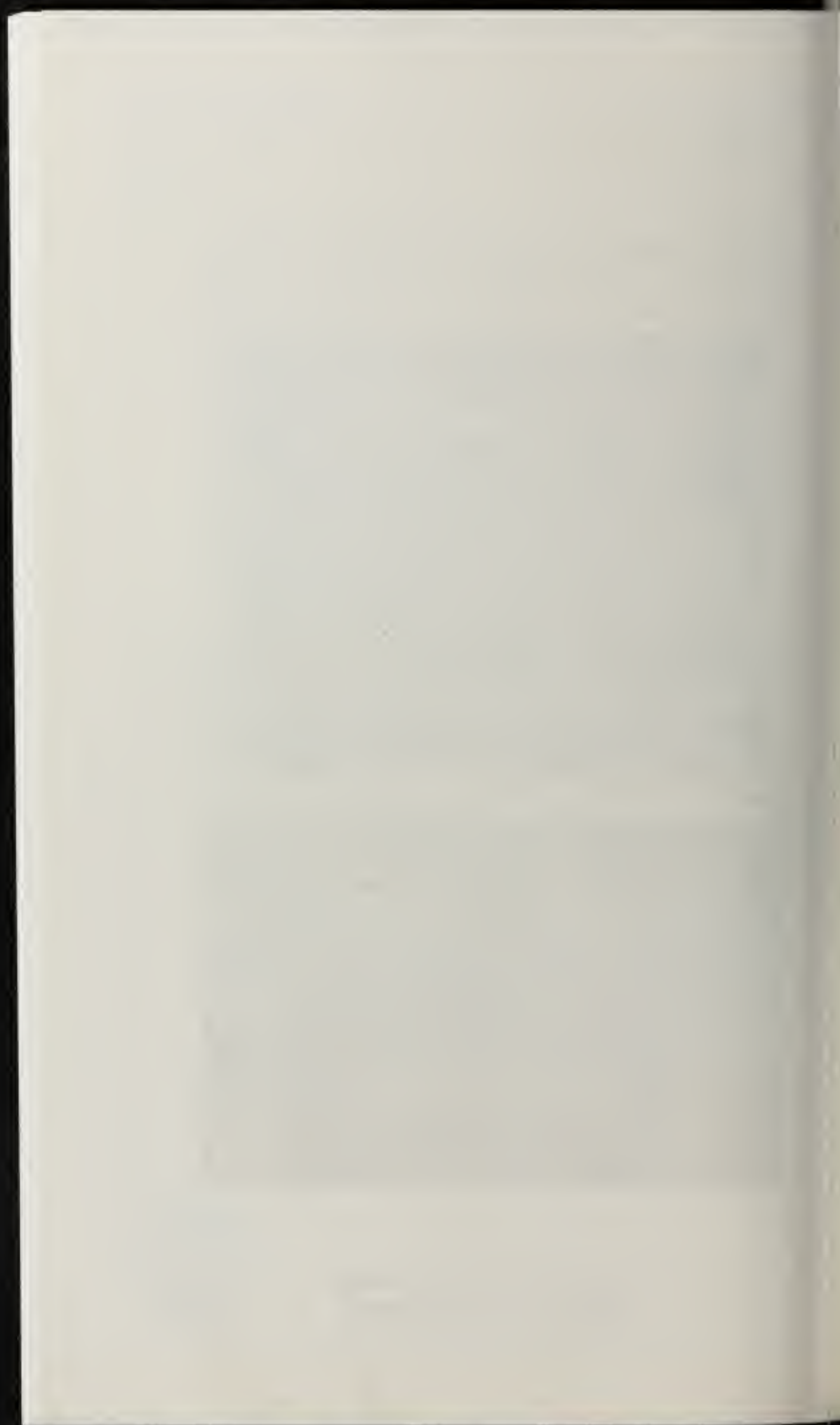
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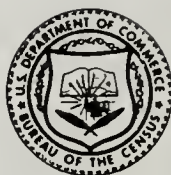
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Library of Congress Cataloging in Publication Data

Johnson, Charles Eyerdal, 1930-
Nonvoting Americans.

(Current population reports : Special studies :
P-23 ; no. 102)

"Issued May 1980."

Supt. of Docs. no.: C 3.186:P-23/102

1. Political participation—United States—History.
2. Presidents—United States—Election—History.
I. Title. II. Series: United States. Bureau of
the Census. Current population reports : Special
studies : Series P-23 ; no. 102.

HA203.A218 No. 102 [JK1764] 312'.0973s 80-607123
[323'.042'0973]

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reface

This report is another in the series of analytical reports prepared by demographers in the Population Division of the Bureau of the Census. These reports feature broad speculative analysis and illustrative hypotheses by the authors to aid in understanding the statistics and assessing their potential impact on public policy. The usual scope of these reports is broader than that of annual Census Bureau reports on population trends and characteristics.

The author wishes to express his appreciation to Richard G. Smolka, professor of political science at American University and editor of *Election Administration Reports*, and Richard M. Scammon, Director of the Elections Research Center, for providing data and assistance in the preparation of this report. Within the Population Division, valuable assistance was provided by Gilbert R. Felton in the preparation of the estimates of the population of voting age, by Paul C. Glick and Meyer Zitter in a critical review of this report, and by Catherine A. Caruso in the preparation of the manuscript.

Charles E. Johnson, Jr., is the Demographic Programs Advisor of the Population Division.

Nonvoting Americans

An apparent disenchantment with the political process has led to declining voter participation in recent Presidential elections. This report places these recent declines in historical perspective by examining voter participation in each of the Presidential elections from the founding of our Country to the present time. In addition, it presents demographic and socioeconomic characteristics of nonvoting Americans. An examination of the reasons why so many Americans do not vote is also presented, as well as descriptions and evaluations of some of the means that have been adopted or proposed to help increase voter participation.

Americans have never participated as actively and completely as they might have in Presidential elections. Nonvoting Americans constituted a *majority* in every election from 1789 to 1924, as more than one-half of the voting-age population did not vote.¹ From 1928 to 1976, nonvoters constituted a silent *plurality* in every election as the number who did not vote was greater than the number who voted for the winning candidate.

Because of historical variations in the population eligible to vote for President and the impossibility of preparing correct estimates of the population legally eligible to register and vote, it is customary to consider the percent of the population of voting age who voted as the standard for comparing voter turnout in Presidential elections. This standard has been used throughout this report.²

Voter turnout before 1920. In our Nation's earliest Presidential elections (from 1789 to 1824) the popular vote was not the primary determinate of election results.³ It was not until the 1828 election that the popular vote became the dominant factor in electing the President. In that election,

¹ Women could not vote in all States prior to 1920, so that it was not unexpected that the nonvoters would constitute the majority prior to that time.

² Approximations of voter turnout among the eligible population for the years from 1824 to 1968, prepared by Walter Dean Burnham, are included in the Census Bureau publication, *Historical Statistics of the United States: Colonial Times to 1970*.

³ The Constitution, in Article II, Section 1, provides for the election of the President of the United States through the establishment of an electoral college in each State for each Presidential election. In the elections from 1789 to 1824, one of the principal methods of determining electoral votes was the election of Presidential electors by the State legislatures themselves.

Andrew Jackson was elected President, but only 22 percent of the voting-age population voted (table A and figure 1). Jackson, an early advocate of democratic participation for the common man, was elected President by only 22 percent of the electorate (figure 2).⁴

Voter participation remained quite low throughout the rest of the 1800s, ranging from 21 percent when Andrew Jackson was reelected in 1832 to 20 percent when Rutherford B. Hayes was elected in 1876.

Table A. Voter Participation Rates Before Universal Suffrage: 1828 to 1916

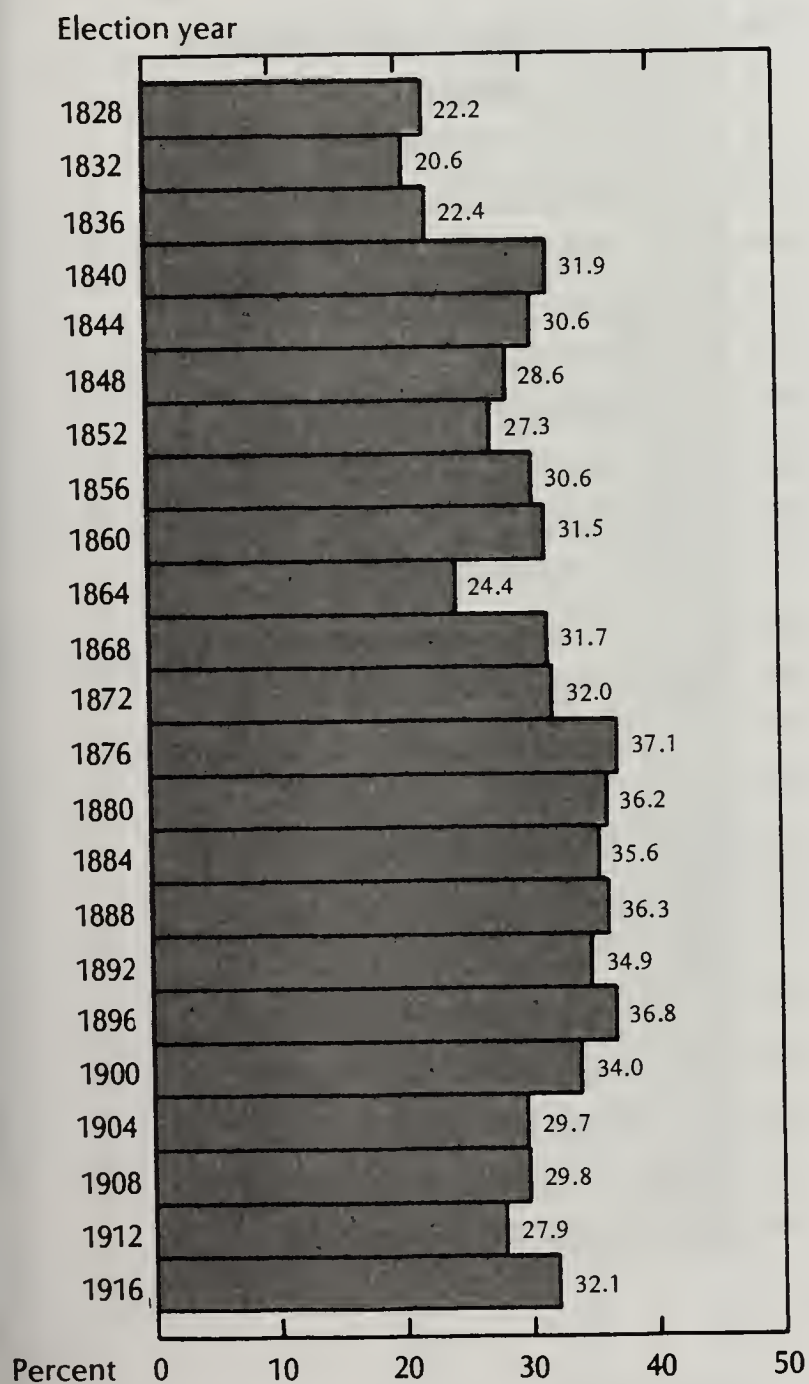
(Resident population)

Election year and winning candidate	Population of voting age	Voters	Voted for winning candidate	Nonvoters
1828, Jackson.	100.0	22.2	12.4	77.6
1832, Jackson.	100.0	20.6	11.6	79.4
1836, Van Buren.	100.0	22.4	11.4	77.6
1840, Harrison	100.0	31.9	16.9	68.1
1844, Polk	100.0	30.6	15.1	69.4
1848, Taylor	100.0	28.6	13.5	71.4
1852, Pierce	100.0	27.3	13.8	72.7
1856, Buchanan	100.0	30.6	13.8	69.4
1860, Lincoln.	100.0	31.5	12.5	68.5
1864, Lincoln.	100.0	24.4	13.4	75.6
1868, Grant	100.0	31.7	16.7	68.3
1872, Grant	100.0	32.0	17.8	68.0
1876, Hayes	100.0	37.1	17.8	62.9
1880, Garfield	100.0	36.2	17.5	63.8
1884, Cleveland	100.0	35.6	17.3	64.4
1888, Harrison	100.0	36.3	17.4	63.7
1892, Cleveland	100.0	34.9	16.1	65.1
1896, McKinley	100.0	36.8	18.8	63.2
1900, McKinley	100.0	34.0	17.6	66.0
1904, Roosevelt	100.0	29.7	16.8	70.3
1908, Taft	100.0	29.8	15.4	70.2
1912, Wilson	100.0	27.9	11.7	72.1
1916, Wilson	100.0	32.1	15.8	67.9

⁴ In these early elections, not everyone was permitted to vote because of laws severely restricting the eligibility to register and vote for President. Women, slaves, Indians, non-citizens, illiterates, convicted felons, prisoners, new residents, institutionalized persons, those who had not paid a poll tax, and other groups have not been permitted to vote at various times throughout our history. While many of the legal barriers to voting in Presidential elections have been removed, some legal restrictions on a person's eligibility to register and vote still exist.

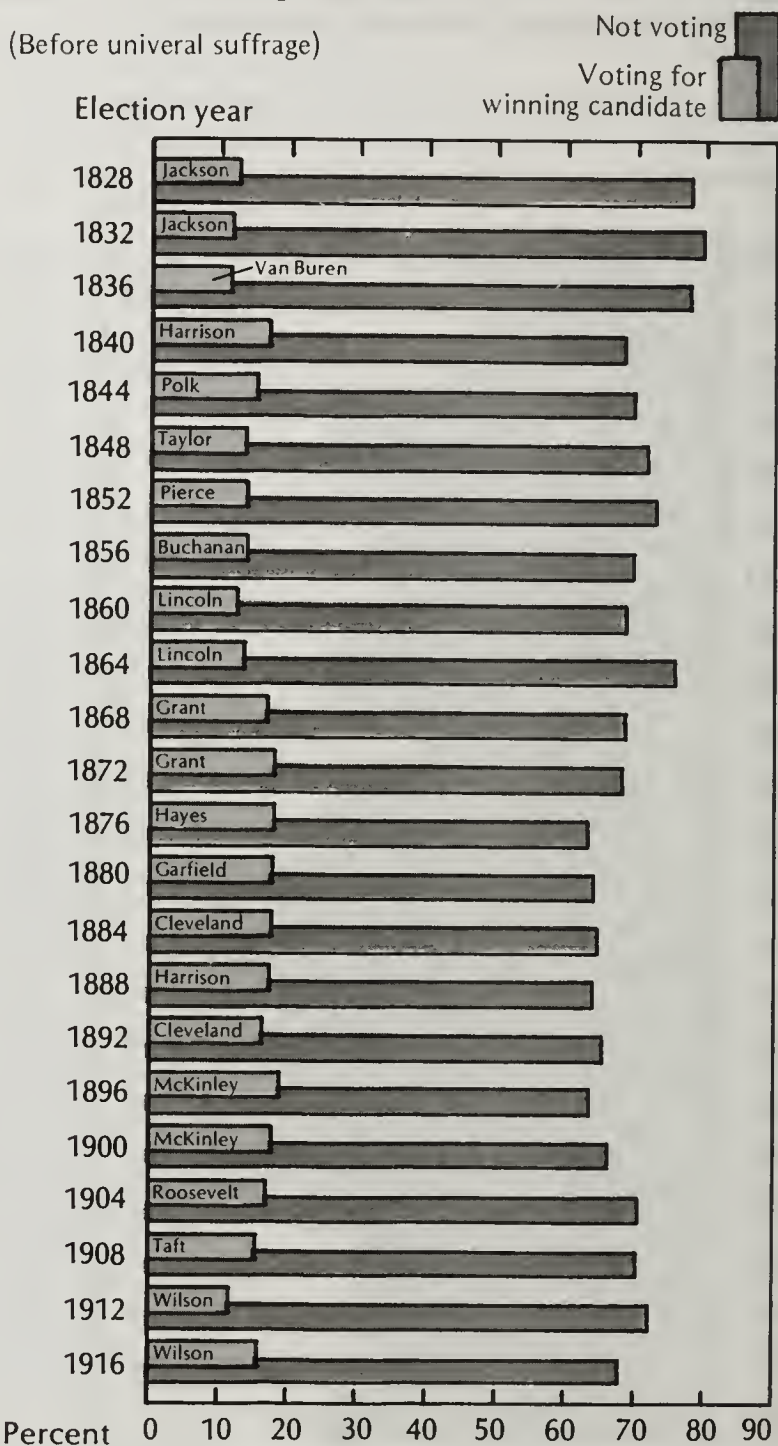
FIGURE 1.
Percent of the Voting-Age Population Who Voted:
1828 to 1916

(Before universal suffrage)



Source: table 1.

FIGURE 2.
Percent Voting for the Winning Candidate and
Percent Not Voting 1828 to 1916



Source: table 1.

Not only was the total voter turnout quite low during the 1800's, but was the proportion voting for the Presidential winner. The proportion of population of voting age casting ballots for the winning candidate ranged from a low of 11 percent in 1836, when Martin Van Buren was elected President, to a high of 19 percent in 1896, when William McKinley was elected.

These election patterns continued into the early years of the 1900's, as voter participation rates remained low and Presidential winners received votes from only a small proportion of the total population.

Voter turnout from 1920 to 1976. In the 1920 election, women were permitted to vote for the first time in every State, as the 19th amendment to the Constitution granting women the right to vote was ratified on August 26, 1920. For the first time, the possibility existed of having more than half of the population of voting age cast their votes for President. However, only 42 percent of the population of voting age voted in the 1920 Presidential election; 26 percent of the voting-age population voted for Warren Harding, the winner, but 58 percent did not vote at all (table B and figures 3 and 4).

In the 1924 election, Calvin Coolidge, who had become President upon the death of Warren Harding, easily won over his principal opponents John Davis and Robert La Follette. In this second election since women's suffrage,

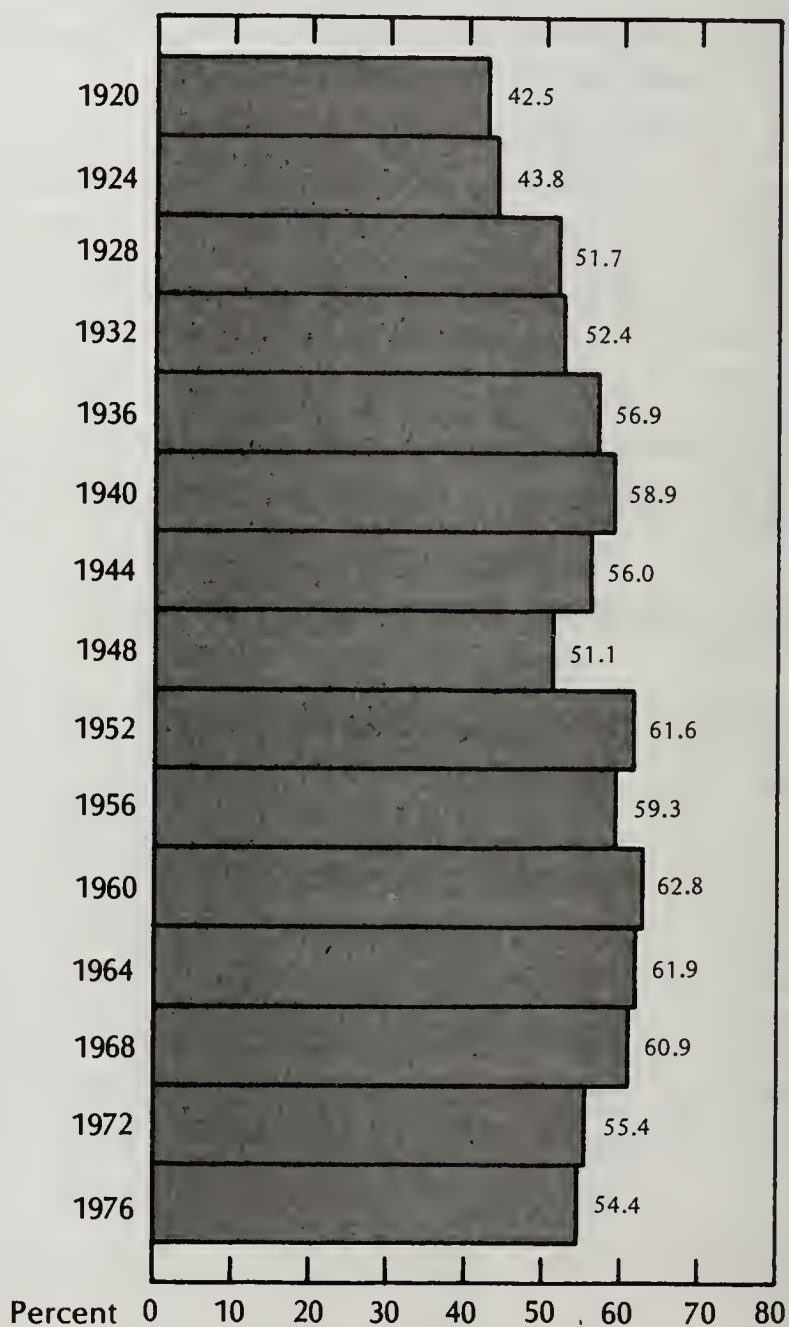
Table B. Voter Participation Rates After Universal Suffrage: 1920 to 1976

(Percent of voting age population)

Election year and winning candidate	Population of voting age	Voters	Voted for winning candidate	Nonvoters
1920, Harding	100.0	42.5	25.6	57.5
1924, Coolidge	100.0	43.8	23.7	56.2
1928, Hoover	100.0	51.7	30.1	48.3
1932, Roosevelt	100.0	52.4	30.1	47.6
1936, Roosevelt	100.0	56.9	34.6	43.1
1940, Roosevelt	100.0	58.9	32.2	41.1
1944, Roosevelt	100.0	56.0	29.9	44.0
1948, Truman	100.0	51.1	25.3	48.9
1952, Eisenhower	100.0	61.6	34.0	38.4
1956, Eisenhower	100.0	59.3	34.1	40.7
1960, Kennedy	100.0	62.8	31.2	37.2
1964, Johnson	100.0	61.9	37.8	38.1
1968, Nixon	100.0	60.9	26.4	39.1
1972, Nixon	100.0	55.4	33.7	44.6
1976, Carter	100.0	54.4	27.2	45.6

FIGURE 3.
Percent of the Voting-Age Population Who Voted:
1920 to 1976

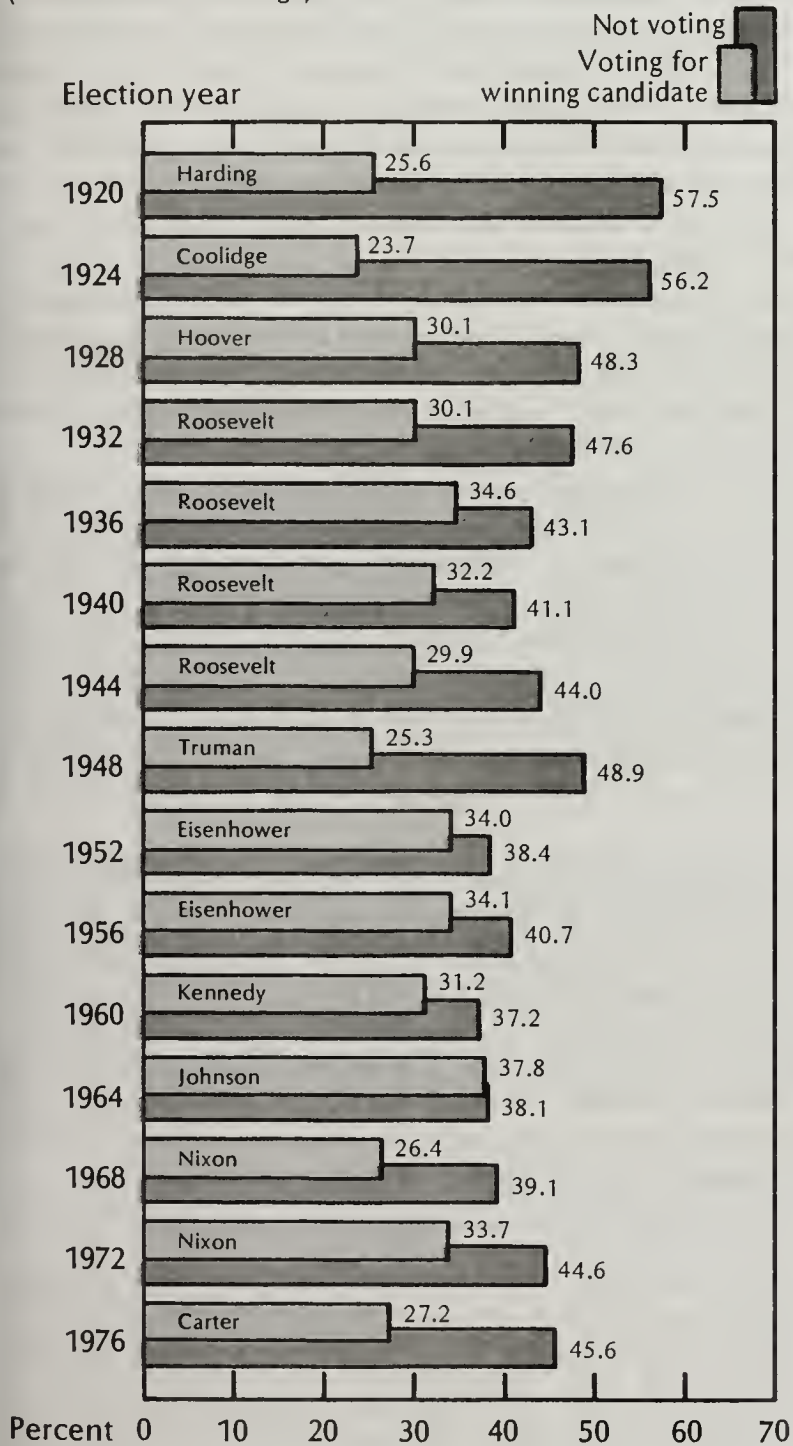
(After universal suffrage)



Source: table 1.

FIGURE 4.
Percent Voting for the Winning Candidate and
Percent Not Voting: 1920 to 1976

(After universal suffrage)



Source: table 1.

less than half the population voted, and Coolidge, for whom 24 percent of the population voted, was easily outdistanced by the "nonvote" of 51 percent.

The 1928 Presidential election was the first in American history where more than half the population voted. In this election, Herbert Hoover, who had been Secretary of Commerce during the Harding and Coolidge administrations, defeated Alfred E. Smith, then Governor of New York, as 52 percent of the population of voting age went to the polls. However, voters cast their ballots for Hoover (30 percent of the voting-age population), well overshadowed by the 48 percent of the population who did not vote.

Voter turnout has remained above the 50 percent level since 1928. The lowest turnout since then was the 51 percent recorded in 1948 when Harry Truman, who succeeded to the Presidency on the death of Roosevelt, was the Presidential victor. Only 25 percent of the voting-age population cast their ballots for Truman, but he had relatively strong opposition from Thomas Dewey, his major opponent, and from minor party candidates J. Strom Thurmond and Henry Wallace.

The highest voter turnout recorded in U.S. history occurred in 1960 when John Kennedy, Senator from Massachusetts, and Richard Nixon, Vice President under Eisenhower, competed for the Presidency. Sixty-three percent of the population of voting age turned out to vote in this historic election. In an extremely close election, Kennedy was the winning candidate, receiving votes from 31 percent of the population. But as in all other Presidential elections, the plurality was held by the nonvoters, as 37 percent of the voting-age population did not vote. Thus, for the 14th time in U.S. history, the Presidential winner received less than 50 percent of the vote cast.

Voter participation has declined in each election since 1960. There was almost an exception to the historically apathetic electoral performance of the American people in the 1964 Presidential election. Lyndon Johnson, who succeeded to the Presidency with the death of Kennedy, recorded the near triumph of having almost as many people vote for him as did not vote at all. Johnson received votes from 37.8 percent of the voting-age population, the highest percentage recorded by a Presidential winner, defeating Barry Goldwater, Senator from Arizona. The voter turnout for Johnson was barely topped by the 38.1 percent who did not vote.⁵

In the 1972 election, the age limitation on voting was lowered to 1

⁵In absolute numbers, there were 43.1 million people who voted for Johnson in 1968 and 43.4 million who did not vote. Although Johnson did not win a plurality of the total population of voting age, he did win a plurality of the total population that was legally eligible to register and vote. Included within the 43.4 million people of voting age who did not vote were approximately 8.3 million residents who were not citizens of the United States or who could not meet the residency or other requirements for registration, as estimated by Meyer Zitter and Donald E. Starsinic in their study "Estimates of Eligible Voters in Small Areas: Some First Approximations" published in the *Proceedings of the Social Statistics Section of the American Statistical Association*, 1966.

years in all States as a result of the ratification of the 26th amendment to the U.S. Constitution.⁶

Voter turnout dropped to 55 percent in 1972 after exceeding 60 percent in the previous three elections. Although younger Americans are less likely to vote than older Americans, their lack of participation was not completely responsible for the lower turnout in 1972, as voter participation also declined for those 21 and over.⁷

In the election of 1972, Nixon easily beat George McGovern, Senator from South Dakota. Despite the magnitude of his victory, the number of nonvoters continued to outnumber those voting for the Presidential winner. Thirty-four percent of the population of voting age voted for Nixon in the 1972 election, more than the 26 percent who voted for him in his 1968 victory, but still not equal to those not voting in 1972 (45 percent).

In the election of 1976, voter turnout declined slightly from the 1972 level, as 54 percent of the population of voting age went to the polls—the lowest level since the 1948 election of Harry Truman. Jimmy Carter defeated Gerald Ford, who had become President upon the resignation of Richard Nixon, receiving votes from 27 percent of the electorate. However, 46 percent of the voting-age population did not vote in 1976.

Nonvoting Americans are the Nation's silent plurality, outnumbering those voting for the winning candidate in every Presidential election. The characteristics of this dominant segment of our population and some of the reasons for their nonparticipation in the electoral process are examined in the following sections which are based on statistical information collected by the Bureau of the Census in the Current Population Surveys conducted immediately after each election.

Characteristics of nonvoting Americans.⁸ Nonvoting Americans are not dissimilar to voting Americans. There are basic demographic and socioeconomic similarities that remain, even though differences exist in voter participation rates among various population groups.

For example, both nonvoters and voters are more likely to be women; in the 1976 Presidential election, women constituted 53 percent of both these groups (table C). Women outnumber men in the United States, and

⁶Prior to this time the voting-age population had been restricted to those 21 and over, except that Georgia had permitted the population 18 and over to vote since 1944 and Kentucky had done so since 1956. Other exceptions included Alaska, which became a State in 1959, where those 19 and over were eligible to vote, and Hawaii, which also joined the Union in 1959, where those 20 and over were eligible to vote.

⁷See *Voting and Registration in the Election of November 1972*, Current Population Reports, Series P-20, No. 253.

⁸The voting and nonvoting percentages in this section on the characteristics of nonvoting Americans are based primarily on the November 1976 Current Population Survey (CPS). The data in this survey, as in other surveys of voting behavior, overstate the number and percent of persons who voted and understate the number and percent of persons who did not vote. For example, CPS estimates show 59 percent of the population reporting that they voted in 1976 as compared with a 54 percent turnout based on a count of the actual votes cast. For further discussion of this overstatement of voting, see *Voting and Registration in the Election of November 1976*, Current Population Reports, Series P-20, No. 322.

Table C. Voter Participation, by Sex, Age, and Race and Spanish Origin: November 1976

(Numbers in thousands. Civilian noninstitutional population of voting age)

Sex, age, and race and Spanish origin	Voters	Nonvoters ¹	Percent voting	Percent not voting ¹	Percent distribution	
					Voters	Nonvoters ¹
Total	86,698	59,850	59.2	40.8	100.0	100.0
Male	41,079	27,878	59.6	40.4	47.4	46.6
Female	45,620	31,972	58.8	41.2	52.6	53.4
18 to 24 years old	11,367	15,585	42.2	57.8	13.1	26.0
25 to 64 years old	61,646	35,949	63.2	36.8	71.1	60.1
65 years old and over	13,685	8,316	62.2	37.8	15.8	13.9
Median age	45.1	35.3	(X)	(X)	(X)	(X)
White	78,808	50,508	60.9	39.1	90.9	84.4
Black	7,273	7,655	48.7	51.3	8.4	12.8
Spanish origin ²	2,098	4,495	31.8	68.2	2.4	7.5

X Not applicable.

¹ Also includes those who were recorded as "do not know" and "not reported" on voting.² Persons of Spanish origin may be of any race.

even though men were slightly more likely to vote than women in the 1976 election, this small difference did not offset the predominance of women among both nonvoters and voters.

As would be expected, both the typical nonvoter and the typical voter are White, even though there are differences in voter turnout between Blacks and Whites. In the 1976 Presidential election, 61 percent of the Whites reported voting as compared with 49 percent of the Blacks, but Whites still constituted 84 percent of all nonvoters as well as 91 percent of the voters.

Because younger Americans are less likely to vote than older Americans, there are some basic differences between the age composition of nonvoters and voters. The lowering of the voting age to 18 by the 26th amendment has led to a widening of the gap in the age difference between nonvoters and voters. In the 1976 election, the median age of the nonvoter was 35 years, while the median age of the voter was 45 years.⁹

Generally, nonvoters and voters are evenly distributed across the Nation, although the South Region has more than its expected share of nonvoters. Thirty-six percent of the Nation's nonvoters in the 1976 election lived in the South, while only 30 percent of the voters were Southerners (table D). The 30-percent proportion of voters living in the South was equalled by residents of the North Central Region. The nearly equal number of voters in these two regions in 1976, even though the South had a larger population, occurred because the 65-percent voter turnout reported in the North Central Region in 1976 was considerably higher than the 55-percent turnout reported in the South.

About two-thirds of the Nation's population live in metropolitan areas (one-third live in nonmetropolitan areas). Even though the residents of metropolitan and nonmetropolitan areas differ in many ways, they do not differ in voter participation rates; most voters and nonvoters, 68 percent in each category, lived in metropolitan areas in 1976. Within these areas, both the voters and nonvoters were more likely to live in suburban areas than in central cities.

Since most adults of voting age are married, it follows that most nonvoters and voters are also married, although there are some differences in voter participation for different marital status categories (table E). Married people are more likely to vote than never married, widowed, or divorced people. But even with the difference in participation levels between those who are married and those who are not, 62 percent of the nonvoters and 74 percent of the voters in the 1976 Presidential election were married.

There are considerable differences in voter turnout by educational attainment levels, as persons with a college education are far more likely to vote than those with less education. In the 1976 Presidential election, only 29 percent of those with less than 5 years of school reported voting as compared

⁹There was a 10-year difference between the average age of the typical nonvoter and the typical voter in 1976. But in the 1968 election, before those 18 to 20 years old could vote in every State and both the nonvoters and voters were older than in 1976, there was only a difference of 5 years between the median age of the nonvoters and the voters.

Table D. Voter Participation, by Residence: November 1976

(Numbers in thousands. Civilian noninstitutional population of voting age)

Area	Voters	Nonvoters ¹	Percent voting	Percent not voting ¹	Percent distribution	
					Voters	Nonvoters ¹
Total	86,698	59,850	59.2	40.8	100.0	100.0
Northeast.	20,194	13,734	59.5	40.5	23.3	22.9
North Central	25,544	13,693	65.1	34.9	29.5	22.9
South	25,869	21,276	54.9	45.1	29.8	35.5
West	15,091	11,148	57.5	42.5	17.4	18.6
Metropolitan	58,943	40,646	59.2	40.8	68.0	67.9
In central cities	24,406	18,714	56.6	43.4	28.2	31.3
Outside central cities	34,537	21,932	61.2	38.8	39.8	36.6
Nonmetropolitan.	27,755	19,204	59.1	40.9	32.0	32.1
Nonfarm	24,822	17,681	58.4	41.6	28.6	29.5
Farm	2,933	1,523	65.8	34.2	3.4	2.5

¹ Also includes those who were recorded as "do not know" and "not reported" on voting.

(Numbers in thousands. Civilian noninstitutional population of voting age)

Marital status, and years of school completed	Voters	Nonvoters ¹	Percent voting	Percent not voting ¹	Percent distribution	
					Voters	Nonvoters ¹
Total	86,698	59,850	59.2	40.8	100.0	100.0
Married	64,033	37,028	63.4	36.6	73.9	61.9
Spouse present	62,231	34,395	64.4	35.6	71.8	57.5
Spouse absent	1,803	2,633	40.6	59.4	2.1	4.4
Widowed or divorced	9,910	9,334	51.5	48.5	11.4	15.6
Never married	12,755	13,488	48.6	51.4	14.7	22.5
Elementary:						
0 to 4 years.	1,353	3,301	29.1	70.9	1.6	5.5
5 to 7 years.	3,472	4,795	42.0	58.0	4.0	8.0
8 years.	6,185	5,843	51.4	48.6	7.1	9.8
High school:						
1 to 3 years.	10,481	11,735	47.2	52.8	12.1	19.6
4 years.	33,058	22,607	59.4	40.6	38.1	37.8
College:						
1 to 3 years.	16,054	7,507	68.1	31.9	18.5	12.5
4 years or more	16,096	4,063	79.8	20.2	18.6	6.8
Not high school graduate	21,491	25,674	45.6	54.4	24.8	42.9
High school graduate	65,208	34,177	65.6	34.4	75.2	57.1

¹ Also includes those who were recorded as "do not know" and "not reported" on voting.

with 80 percent of those who had completed 4 or more years of college. However, nonvoting Americans are not always people with low levels of education; the majority of nonvoters (57 percent) and voters (75 percent) in 1976 were persons who had completed at least a high school education.

Most adults in America are in the labor force as are most nonvoters and voters, therefore, the nonvoter is not someone out of the economic mainstream (table F). There is a difference in voter participation by labor force status, as persons in the labor force are more likely to vote than those not in the labor force. But even with this difference, 61 percent of nonvoters and 65 percent of voters were in the labor force in 1976.

One area in which there are some major differences between voters and nonvoters is in their major occupation groups. While the number of Americans who were employed as white-collar workers was slightly larger than the number employed as blue-collar, service, and farm workers, white-collar workers were much more likely to vote than workers employed in these other groups (72 percent and 51 percent, respectively) in 1976. The net result of these differences is that among the employed, white-collar workers constituted 60 percent of the voters but only 38 percent of the nonvoters. Blue-collar, service, and farm workers, however, constituted 62 percent of the employed nonvoters and only 40 percent of the voters.

Another major difference between voters and nonvoters is found in their family incomes. Persons with a high family income are more likely to vote than those with a low income. For example, 77 percent of those living in families with incomes of \$25,000 or more reported voting in the 1976 election, compared with only 45 percent of those in families with incomes under \$5,000.¹⁰ Among nonvoters in 1976, the median family income was considerably lower (\$9,807) than it was for voters (\$13,485).

In summary, the evidence shows that the typical nonvoter is: a White woman in her mid-thirties, a Southern resident, a suburban dweller, married, at least a high school graduate, and a blue-collar worker with a family income of around \$10,000. The typical voter, with some exceptions, is quite similar: a White woman in her mid-forties, a Southern resident, a suburban dweller, married, at least a high school graduate, and a white-collar worker with a family income of about \$13,500.

Reasons for not voting. Many reasons have been advanced to explain why so many Americans stay away from the polls on election day. Primarily, people do not vote either because of physical and legal barriers or psychological reasons, such as lack of interest, apathy, or alienation.

One major study of reasons for not voting and possible remedies to increase voter turnout was the work of the Commission on Registration and Voting Participation, appointed by President Kennedy. This Commission, noting that one-third of the voting-age population did not vote in the 1960

¹⁰ These income figures slightly understate the true income figures because only one global income question was asked in the November CPS and more detailed questions are needed to provide complete income data.

(Numbers in thousands. Civilian noninstitutional population of voting age)

Employment status, occupation, and family income	Voters	Nonvoters ¹	Percent voting	Percent not voting ¹	Percent distribution	
					Voters	Nonvoters ¹
Total	86,698	59,850	59.2	40.8	100.0	100.0
Civilian labor force	56,125	36,338	60.7	39.3	64.7	60.7
Employed.	53,314	32,720	62.0	38.0	61.5	54.7
Unemployed.	2,812	3,618	43.7	56.3	3.2	6.0
Not in labor force	30,573	23,512	56.5	43.5	35.3	39.3
Total employed	53,314	32,720	62.0	38.0	100.0	100.0
White-collar workers	31,806	12,310	72.1	27.9	59.7	37.6
Blue-collar workers	14,186	14,316	49.8	50.2	26.6	43.8
Service workers.	5,769	5,162	52.8	47.2	10.8	15.8
Farm workers.	1,553	932	62.5	37.5	2.9	2.8
Total in families ²	85,451	57,834	59.6	40.4	100.0	100.0
Under \$5,000.	10,919	13,470	44.8	55.2	12.8	23.3
\$5,000 to \$9,999	17,517	16,068	52.2	47.8	20.5	27.8
\$10,000 to \$14,999.	20,505	13,916	59.6	40.4	24.0	24.1
\$15,000 to \$24,999.	24,515	10,709	69.6	30.4	28.7	18.5
\$25,000 and over	11,995	3,671	76.6	23.4	14.0	6.3
Median income	\$13,485	\$9,807	(X)	(X)	(X)	(X)

X Not applicable.

¹ Also includes those who were recorded as "do not know" and "not reported" on voting.

² Persons not reporting their family income have been prorated among those who did report.

Presidential election, made numerous recommendations for alleviating the various restrictive legal and administrative procedures required to register and vote. Most of these have since been adopted through legislation.¹¹

The Voting Rights Act of 1965 abolished literacy tests as a prerequisite for voting, removed all barriers preventing Blacks and other minorities from registering and voting, and permitted new State residents to vote for President. The 24th amendment, ratified in 1964, eliminated the poll tax as a qualification for voting, and the 1970 Voting Rights Act Amendments¹² specified that local residence requirements to register and vote should not exceed 30 days.

While these legal actions removed most of the barriers to registration and voting, they did not lead to a dramatic rise in voter participation. In fact, voter participation is lower now than it was in 1960. In that Presidential election, one-third of the voting-age population did not vote, but in the 1976 Presidential election, nearly one-half of the electorate did not vote. Of course, America's recent voting record might have been even lower if it had not been for the introduction of these various legal actions.

There was one legislative action, however, which led to a *reduction* in the overall voter participation rate. This was the ratification of the 26th amendment to the Constitution. This amendment gave persons 18 to 20 years old, a group with traditionally lower turnout rates, the right to vote in all States beginning with the 1972 Presidential election.

Some insight into the reasons why so many people fail to participate in the electoral process is provided by data from the Census Bureau's Current Population Survey. Following the Presidential election of 1976, respondents to the Current Population Survey were asked if they had registered and voted, and those who had not were asked the reason why.

Responses to the questions on voter participation indicated that in the 1976 election, 4 out of 10 had not voted,¹³ and most of the nonvoters (8 out of 10) were not registered to vote (tables C and G). By and large, most of the people who were registered actually voted—90 percent in 1976. Among those who were registered to vote in 1976 but did not do so, about 6 out of 10 reported that they were *unable* to vote because they were ill, out of town, unable to take time off from work, or were prevented from voting by some similar reason. The other 4 out of 10 reported that they did not vote in 1976 because they were *not interested* in voting, did not prefer any of the candidates, or else reported some other reason for their lack of desire to vote (table H).

¹¹ See the Commission's *Report on Registration and Voting Participation*, U.S. Government Printing Office, Washington, D.C., 1963; V. Lance Tarrance, Jr., "The Realities of Nonvoting," *Harvard Political Review*, Fall 1973; and Curtis B. Gans, "The Empty Ballot Box: Reflections on Nonvoters In America," *Public Opinion*, September/October 1978.

¹² These 1970 Amendments abolished durational residence requirements as a precondition to voting for President and required the States to register all duly qualified residents who applied not later than 30 days prior to a Presidential election.

¹³ Respondents in the Current Population Survey, as in other surveys of voter participation tend to overreport their actual participation rates which are somewhat higher based on survey results than the actual rate.

Table G. Registration Status and Reason for Not Registering or Voting, for the Nonvoting Population of Voting Age: November 1976

(Numbers in thousands. Civilian noninstitutional population)

Registration status and reason for not registering or voting	Number	Percent
Total reported not voting ¹	48,486	100.0
Registered	10,231	21.1
Unable to vote.	5,887	12.1
Not interested in voting.	4,344	9.0
Not registered.	38,255	78.9
Unable to register.	12,793	26.4
Not interested in registering . . .	25,462	52.5

¹ Excludes those not reporting on registration or not reporting on reason for not registering or voting.

Table H. Reason for Not Voting, for the Registered Population of Voting Age: November 1976

(Numbers in thousands. Civilian noninstitutional population)

Reason for not voting	Number	Percent
Total reported registered but not voting ¹	10,231	100.0
Unable to vote	5,887	57.5
Illness or emergency	2,157	21.1
Out of town or away from home. . .	1,561	15.3
Couldn't take time off from work, had no way to get to polls	1,205	11.8
Other reason.	964	9.4
Not interested in voting	4,344	42.5
Did not prefer any of the candidates, not interested in the election this year.	2,060	20.1
Did not get around to it, or forgot or similar reason.	1,846	18.0
Other reason.	438	4.3

¹ Excludes those not reporting on reason for not voting.

The major reason for nonregistration was lack of interest. Actual barriers to registration precluded participation in the electoral process for only a relatively small component of the population; two-thirds of those who were not registered were not interested in registering (table 1). Among those of voting age who reported that they were unable to register, one-third were not U.S. citizens and were ineligible to register. Only 6 percent of those who were not registered reported that they had failed to register because of such barriers as lack of transportation, inconvenient hours or place of registration, or because they did not know how or where to register. A similar proportion reported that they did not meet the residence requirements (30 days in 1976) or had recently moved and just never got around to registering at their new address.

Among those who indicated an insufficient amount of interest in registering, the majority (55 percent) gave themselves an excuse to legitimize their failure to register: they did not get around to it, forgot, did not know they

Table 1. Reason for Not Registering, for the Population of Voting Age: November 1976

(Numbers in thousands. Civilian noninstitutional population)

Reason for not registering	Number	Percent
Total reported not registered ¹	38,225	100.0
Unable to register	12,793	33.4
Not a citizen	4,383	11.5
Residence requirement not met or recently moved and never got around to it.	2,591	6.8
No transportation, hours or place inconvenient, did not know how or where to register.	2,443	6.4
Permanent illness or disability	1,383	3.6
Other reason	1,993	5.2
Not interested in registering.	25,462	66.6
Did not get around to it, forgot, didn't know had to, or other similar reason	14,043	36.7
Did not prefer any of the candidates or not interested in election this year.	6,959	18.2
Did not want to get involved in politics.	2,320	6.1
Vote would not make a difference.	758	2.0
Other reason	1,382	3.6

¹ Excludes those not reporting on reason for not registering.

ad to, or some similar reason. The rest reported that they were not interested in the election, the candidates, or politics, or some similar reason such as a belief that their vote would not make a difference.

Can voter participation be increased? Since most of the barriers to registration and voting in the United States have been removed by legal actions, it appears that the majority of Americans who do not vote are just not interested in voting. Still, most Americans who are registered to vote actually do vote on election day, so efforts have continued to simplify the registration process in the hopes of further increasing voter turnout.¹⁴

One proposal to increase voter participation is to permit voter registration by mail. Several bills were recently introduced in Congress that would have required the Federal Government to provide for the mail registration of all eligible voters.¹⁵ However, none of these proposals were enacted by the Congress, as critics of the bills cited the possibilities of fraud, the costs and complexity of inaugurating and maintaining the system, and the fact that voter apathy seemed to be the primary reason for low voter turnout. However, even though no Federal legislation was passed, 16 States and the District of Columbia adopted or greatly expanded procedures for registration by mail between the Presidential elections of 1972 and 1976.

States permitting registration by mail did not mail registration cards to all addresses, as was proposed for the national mail registration system, but allowed the distribution of mail registration forms by political parties, civic and labor organizations, and other groups. However, in these areas, which contained nearly one-half of the U.S. population, overall voter turnout did not increase between the 1972 and 1976 elections. In fact, there was a decline of 2 percentage points (from 56 percent to 54 percent) in the voter participation rate in these mail registration areas. In those States which did not permit registration by mail, voter turnout remained the same (55 percent) both 1972 and 1976. California and New York, the two most populous States in the Nation, inaugurated post card registration between 1972 and 1976, but the voter participation rate declined by 9 percentage points in California and by 5 percentage points in New York between these elections.¹⁶

Of course, the use of mail registration did not, in itself, lead to the decline in voter turnout; nine of the States which adopted a mail registration system, as well as the District of Columbia, had increases in voter participation. But since there was an overall decline of 2 percentage points in the voter par-

¹⁴ See Richard G. Smolka, *Registering Voters by Mail: The Maryland and New Jersey Experience*, American Enterprise Institute, Washington, D.C., 1975; and Richard G. Smolka, *Election Day Registration: The Minnesota and Wisconsin Experience in 1976*, American Enterprise Institute, Washington, D.C., 1977.

¹⁵ For a discussion of some of these proposals see *The Concept of National Voter Registration*, Hearing before the Subcommittee on Census and Statistics of the Committee on Post Office and Civil Service, House of Representatives, 92d Congress, Serial No. 92-51, Washington, D.C. U.S. Government Printing Office, 1972.

¹⁶ Data on mail registration was abstracted from *Election Day Registration*, *op. cit.*, and from information provided by Richard G. Smolka, editor, *Election Administration Reports*.

ticipation rate in the States which began mail registration systems, it is clear that the system, at least as it is presently practiced, has no proven effect on voter participation. However, it is possible that voter participation rate might have dropped even more without the mail registration system.

Moreover, even though a mail registration system might make registration easier for the voters, this method has not been universally accepted by the public, for the voters in the State of Washington repealed a newly passed mail registration law in 1977 by a 2-to-1 margin.

Another major innovation designed to increase voter participation is the proposal to permit people to register to vote on election day. A bill to permit election day registration throughout the United States was introduced in Congress in 1977, but failed to become law.¹⁷ However, election day registration was inaugurated in Minnesota and Wisconsin for the 1976 Presidential election. Voter turnout was somewhat higher in these States in 1976 than had been in 1972, as voter participation increased from 68 percent to 72 percent in Minnesota and from 62 to 66 percent in Wisconsin.

However, not all of the gain in voter turnout in these States was directly attributable to election day registration. In Wisconsin, some localities did not require registration in either the 1972 or 1976 elections. Other localities which did require registration in both these elections, changed their system to permit election day registration in the 1976 election. Richard G. Smolka, in his study of election day registration, noted that voter participation was higher in Wisconsin in 1976 than it was in 1972 in all localities. In Minnesota there was also the possibility that voter turnout may have increased because Walter Mondale, a native son, was on the ballot.¹⁸

The increase in voter turnout in States with election day registration, was small and accompanied by procedural problems, as Smolka notes:

Election day registration probably contributed to a marginal increase in voter turnout, about 1 or 2 percentage points both in Minnesota and in Wisconsin, but it also encouraged many voters to wait until election day to register. It caused confusion and long lines at the polls, and errors were made that permitted hundreds of voters to vote in the wrong precincts or wards.¹⁹

Other procedural changes in the registration system have also been proposed in attempts to increase voter turnout in Presidential elections. Rosenstone and Wolfinger, of the University of California, studied the effect of some of these proposed changes in registration laws might have on voter turnout. Using data from the November 1972 voting supplement to the Current Population Survey, they concluded that some further gains in registration could be made if States permitted people to register up to 1 week

¹⁷ For a discussion of this proposed act see *Universal Voter Registration Act of 1977*, Hearings before the Committee on House Administration, House of Representatives, 95th Congress, Washington, D.C., U.S. Government Printing Office, 1977.

¹⁸ Election Day Registration, *op. cit.*, pp. 45-46 and 53-54.

¹⁹ *Ibid.*, p. 68.

before the election and if registration offices were open during normal business hours, evenings, and Saturdays.²⁰

Summary. Voter participation, as measured by the percent voting among the population of voting age, has been relatively low throughout American history. In every American Presidential election until 1928, more than one-half of the population of voting age did not vote because of legal restrictions and barriers to registration or lack of interest. The first time more than one-half of the population voted was in the election of 1928, 8 years after universal suffrage was established. The high point of voter participation occurred in the 1960 Kennedy-Nixon election when 63 percent of the population voted. However, since that time, electoral participation has declined, with only 54 percent of the voting-age population voting in the 1976 election.

The number of people voting for the President has, in every case, been less than the number of people not voting at all. Lyndon Johnson, in his 1964 victory, came the closest of any President to winning a plurality among the entire population of voting age.

Those who do not vote in Presidential elections are generally similar to those who do vote, even with differences in voter participation rates among the various subgroups of population.

Most of the legal barriers which limited registration and voting in earlier years have been removed, so the primary reason people do not register and vote is because they are not interested. Two-thirds of those who were not registered reported they were not interested in registering. Most nonvoters were not registered (8 out of 10 in the 1976 election), and most of the people who are registered vote (9 out of 10 in the 1976 election).

More Americans might vote if there were further easing of registration procedures. For example, in Canada and Great Britain, where the governments initiate the registration process rather than leaving it up to the individual, 76 percent of the eligible population voted in the May 1979 elections.²¹ However, in the United States, the increased use of mail registration in some States between 1972 and 1976 did not lead to an increase in voter participation, and the use of election day registration in Minnesota and Wisconsin in the 1976 Presidential election led to only modest gains in voter turnout. Even with these limitations, efforts to ease the registration procedures are still worthwhile, for as Richard M. Scammon noted:

Democracy does not require total voter participation, and totalitarian elections with their 99.9 percent voter turnouts are mere exercises in contempt of the democratic idea. But democracy does require that the voter have not only the right to vote, but also an administratively easy way to put that right to use.²²

²⁰ Steven J. Rosenstone and Raymond E. Wolfinger, "The Effect of Registration Laws on Voter Turnout," *The American Political Science Review*, Vol. 72, No. 1, (March 1978), pp. 22-45.

²¹ Reported by Richard M. Scammon, Director of the Elections Research Center at the Governmental Affairs Institute.

²² Richard M. Scammon, "Electoral Participation," *The Annals of the American Academy of Political and Social Science*, Vol. 371, (May 1967), p. 71.

Table 1. Voter Participation in Presidential Elections: 1828 to 1976

(Numbers in thousands. Resident population)		Percent distribution						
		Population of voting age		Voted for winning candidate		Voted for winning candidate		
Election year and winning candidate	Population of voting age	Voters	Voted for winning candidate	Nonvoters	Population of voting age	Voters	Voted for winning candidate	Nonvoters
Before universal suffrage:								
1828, Jackson	5,201	1,155	647	4,046	100.0	22.2	12.4	77.8
1832, Jackson	5,914	1,218	688	4,696	100.0	20.6	11.6	79.4
1836, Van Buren	6,710	1,505	765	5,205	100.0	22.4	11.4	77.6
1840, Harrison	7,566	2,412	1,275	5,154	100.0	31.9	16.9	68.1
1844, Polk	8,840	2,701	1,338	6,139	100.0	30.6	15.1	69.4
1848, Taylor	10,081	2,879	1,361	7,202	100.0	28.6	13.5	71.4
1852, Pierce	11,582	3,162	1,601	8,420	100.0	27.3	13.8	72.7
1856, Buchanan	13,235	4,045	1,833	9,190	100.0	30.6	13.8	69.4
1860, Lincoln	14,880	4,690	1,866	10,190	100.0	31.5	12.5	68.5
1864, Lincoln	16,450	4,011	2,207	12,439	100.0	24.4	13.4	75.6
1868, Grant	18,019	5,720	3,013	12,299	100.0	31.7	16.7	68.3
1872, Grant	20,176	6,460	3,597	13,716	100.0	32.0	17.8	68.0
1876, Hayes	22,724	8,422	4,037	14,302	100.0	37.1	17.8	62.9
1880, Garfield	25,462	9,217	4,453	16,245	100.0	36.2	17.5	63.8
1884, Cleveland	28,275	10,053	4,880	18,222	100.0	35.6	17.3	64.4
1888, Harrison	31,377	11,383	5,447	19,994	100.0	36.3	17.4	63.7
1896, McKinley	37,745	12,007	5,100	25,738	100.0	31.8	16.1	68.2

1908, Tail 49,919 14,884 7,675 35,035 100.0 29.8 15.4 70.2
 1912, Wilson. 53,830 15,037 6,297 38,793 100.0 27.9 11.7 72.1
 1916, Wilson. 57,708 18,531 9,128 39,177 100.0 32.1 15.8 67.9

After universal suffrage:

1920, Harding.	62,988	26,748	16,143	36,240	100.0	42.5	25.6	57.5
1924, Coolidge	66,414	29,086	15,718	37,328	100.0	43.8	23.7	56.2
1928, Hoover	71,185	36,812	21,392	34,373	100.0	51.7	30.1	48.3
1932, Roosevelt.	75,768	39,732	22,810	36,036	100.0	52.4	30.1	47.6
1936, Roosevelt.	80,174	45,643	27,753	34,531	100.0	56.9	34.6	43.1
1940, Roosevelt.	84,728	49,900	27,308	34,828	100.0	58.9	32.2	41.1
1944, Roosevelt.	85,654	47,977	25,607	37,677	100.0	56.0	29.9	44.0
1948, Truman.	95,573	48,794	24,179	46,779	100.0	51.1	25.3	48.9
1952, Eisenhower	99,929	61,551	33,936	38,378	100.0	61.6	34.0	38.4
1956, Eisenhower	104,515	62,027	35,590	42,488	100.0	59.3	34.1	40.7
1960, Kennedy	109,672	68,838	34,227	40,834	100.0	62.8	31.2	37.2
1964, Johnson.	114,090	70,645	43,130	43,445	100.0	61.9	37.8	38.1
1968, Nixon	120,285	73,212	31,785	47,073	100.0	60.9	26.4	39.1
1972, Nixon	140,068	77,625	47,170	62,443	100.0	55.4	33.7	44.6
1976, Carter	150,127	81,603	40,831	68,524	100.0	54.4	27.2	45.6

Note: The population of voting age for the United States for each Presidential election year 1828 to 1920 was based on the population enumerated in each decennial census beginning in 1820 and ending in 1930 published in *Historical Statistics of the United States, Colonial Times to 1970 Bicentennial Edition*, Part 2. The census data for a few census years was adjusted slightly to reflect nonreporting of age. Linear interpolation in the number of persons 21 years old and over in consecutive censuses provided estimates for each of the election years. The estimates of the population of voting age for election year beginning with 1932 were published previously in Current Population Reports, Series P-25, No. 732.

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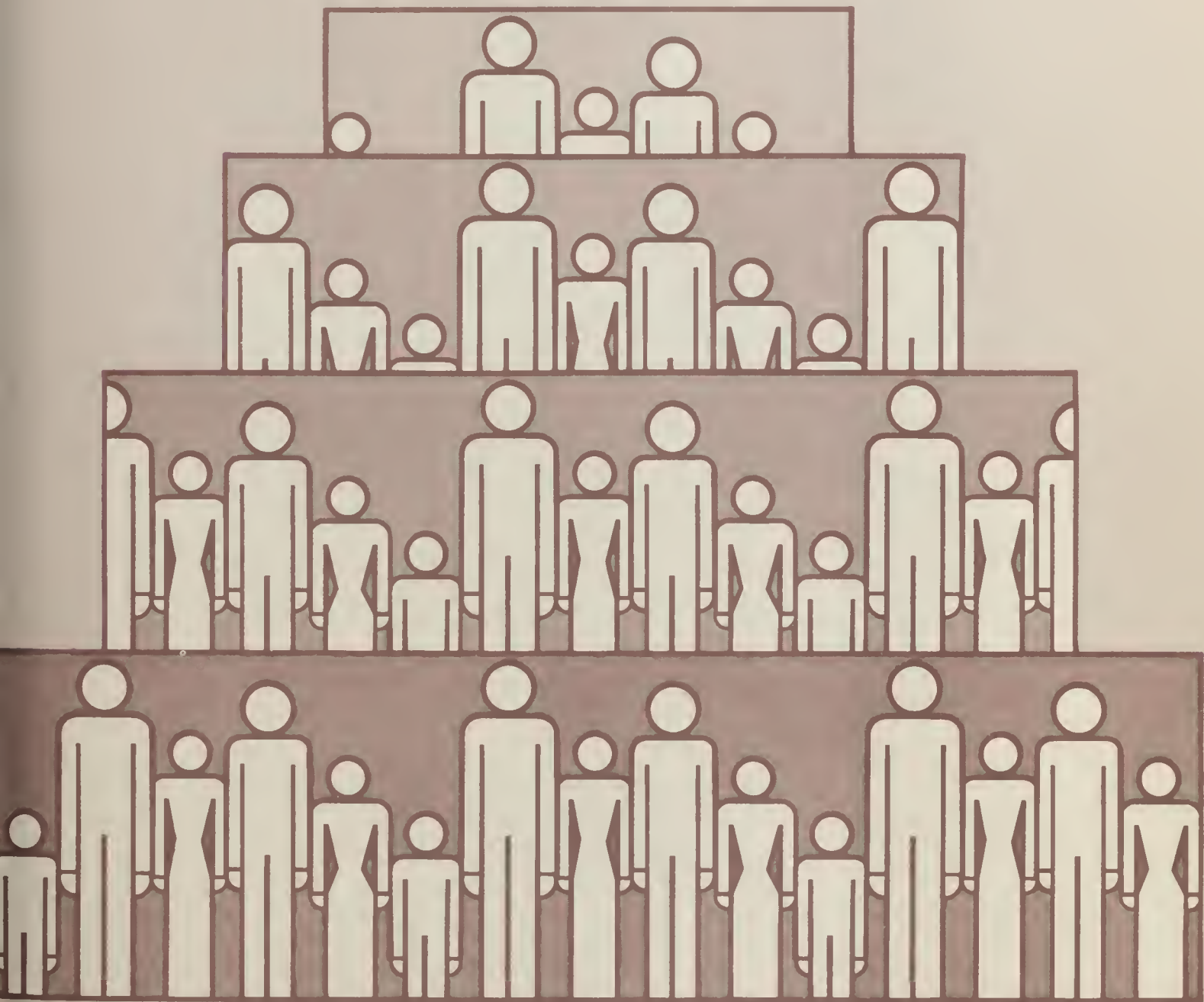
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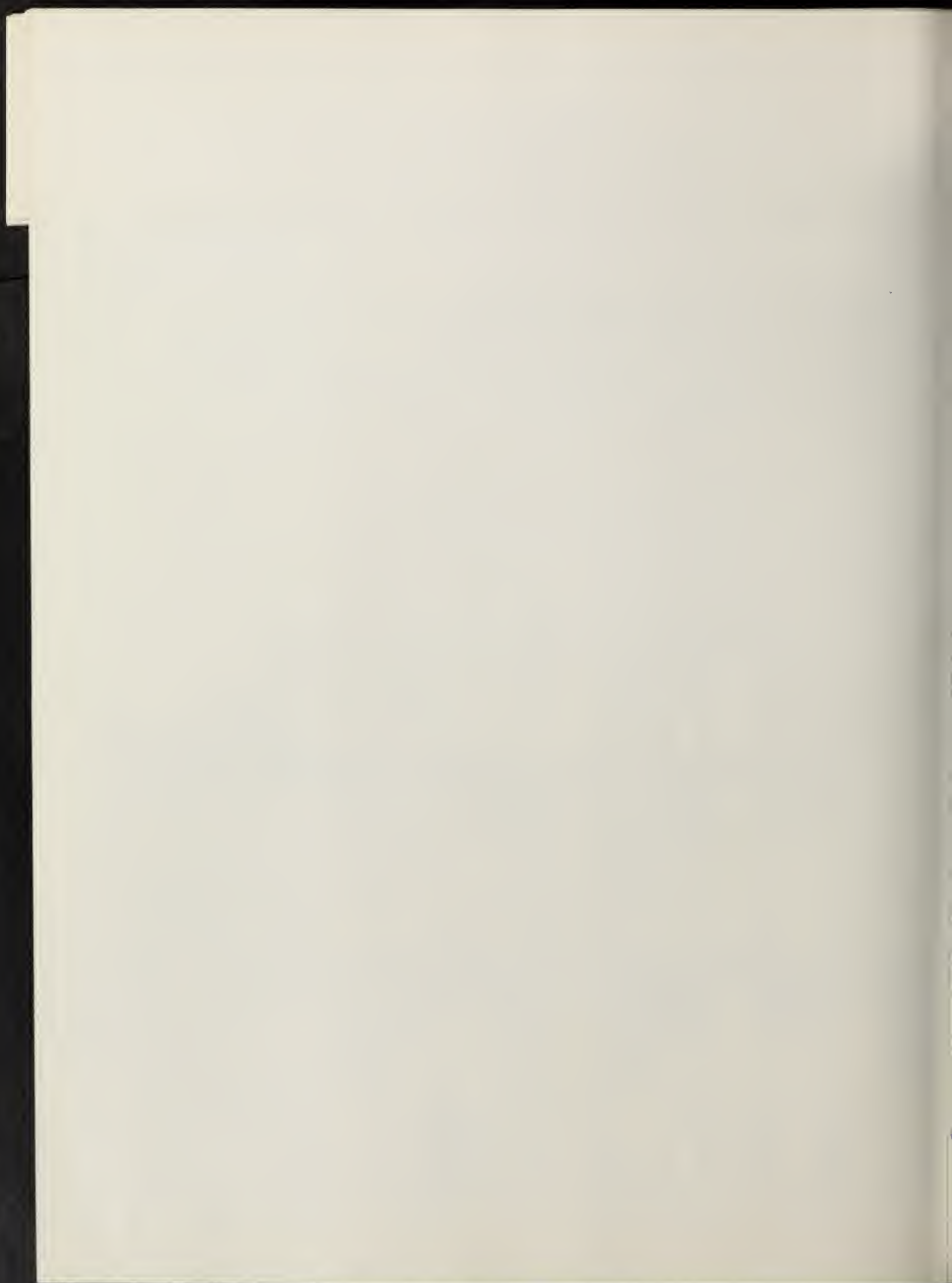


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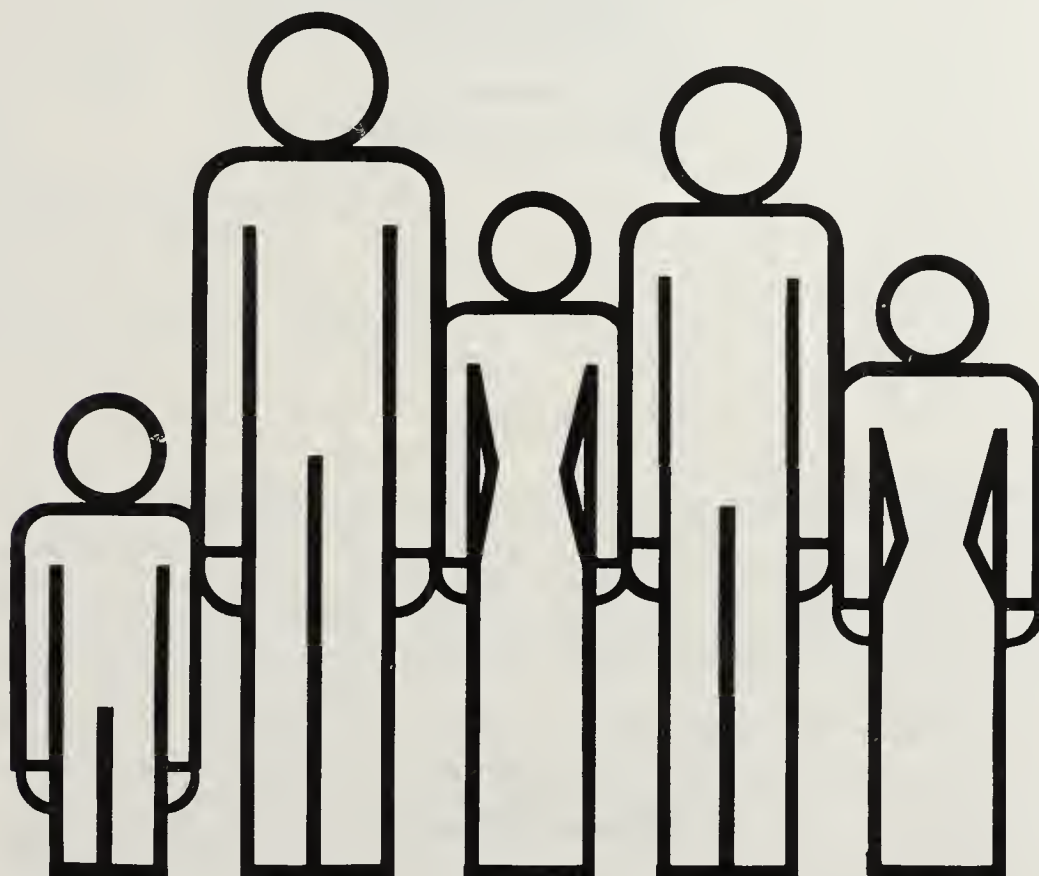
Methodology for Experimental Estimates of the Population of Counties, by Age and Sex: July 1, 1975





Special Studies, Series P-23, No. 103
Issued May 1980

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U.S. Department of Commerce

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ACKNOWLEDGMENTS

This report was prepared by **Richard Irwin**, Estimates Research Unit. The project was initiated at the request of the National Cancer Institute, which provided major financial support. Statistical assistance was provided by **Bonnie Damon**, **Florence Schwartz**, and **Brenda Vines**. Computer applications and programming were by **Jerome Glynn**, with the assistance of **Jean Fansler**, **Marion Fox**, and **Marie Pees**. Editorial assistance was provided by **Marion Porter**. Professional consultation and review were provided by **Sam Davis III**, **Richard Engels**, **Evie Griffiths**, **Signe Wetrogan**, and **David Word** of the Population Division and **Thomas Mason** of the National Cancer Institute.

SUGGESTED CITATION

U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 103, *Methodology for Experimental Estimates of the Population of Counties, by Age and Sex: July 1, 1975*, U. S. Government Printing Office, Washington, D.C., 1980.

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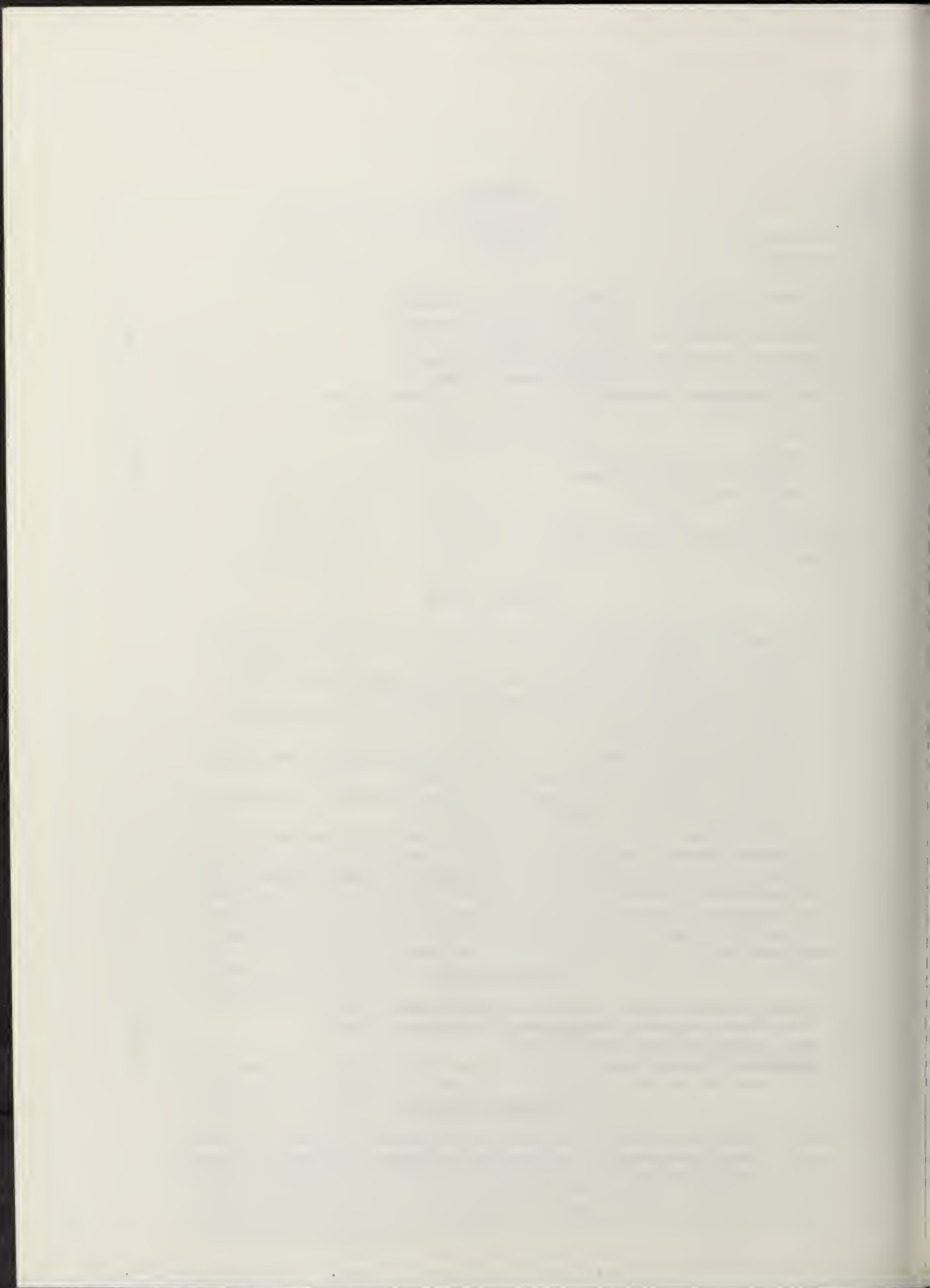
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Methodology for Experimental Estimates of the Population of Counties, by Age and Sex: July 1, 1975

INTRODUCTION

This report describes the methodology used to prepare experimental estimates of the population by age and sex for counties in the United States on July 1, 1975. Census data on gross outmigration and immigration were used for the first time in developing age estimates for counties, and revised techniques in the treatment of military and college population were introduced. The resulting procedures are generally applicable to other projects of this type.

The estimates are considered experimental because they have not been systematically tested against census data, as is customary with the regular postcensal estimate programs in which the Bureau of the Census is involved. However, tests were conducted with available special census data. The findings of the evaluation work, the general limitations of the estimates, and special problem areas are discussed in the section titled "Evaluation and Limitations of the Estimates." Estimates have been prepared for each year 1970 through 1977 using an extension of the methods used in preparing 1975 estimates. The estimates can be obtained from the Data User Services Division and are for 5-year age groups to 64 years and over, by sex. The estimates are consistent with estimates of the total population of counties published in Current Population Reports, Series P-25 and P-26. They are also generally consistent with estimates of the U.S. resident population, by age and sex, published in Series P-25.

The estimates for all years are for 3,141 counties or county equivalents as delineated by the 1970 census. In Virginia, Nansemond County and Suffolk City were merged to become Suffolk City in 1974. They were calculated separately because of the nature of the basic data, and the estimates are valid only when added together to obtain a total for the area.

The estimates were prepared by carrying forward the 1970 census counts by age cohort using registered births and estimated deaths by age and basing the age-sex detail of migrants on the information provided for the period 1965-70 from the 1970 census. The migrant data used were obtained from a special tabulation, as described in the section on methodology, and were relied upon to establish only the age distribution of migrants, not the levels of migration. The 1970 population data upon which the estimates are based are consistent with those used in the ongoing postcensal estimate programs, and reflect corrections to the census counts made subsequent to the release of the official figures.

METHODOLOGY

General. The cohort-component technique was used to prepare the estimates, making separate estimates of births, deaths, and migration, by age, sex, and race. The population in 1970 was carried forward to 1975, by cohort, using estimates of births and deaths adjusted so as to agree with registered totals. A preliminary approximation of outmigration from 1970 to 1975 was obtained for each county, by cohort, using outmigration rates for the period 1965-70. The outmigrants were summed to form a pool which, after adjustments for immigration and national change in military, college, and institutional population, was distributed back to each county as immigrants, using the proportions of the total pool that each county was observed to have received in 1965-70. The preliminary outmigration and immigration data were then adjusted, sometimes extensively, to bring the 1975 population and 1970-75 migration levels into agreement with independent total population estimates for each county developed for the Federal General Revenue Sharing program. Revised population estimates through the Federal-State Cooperative Program for Local Population Estimates had not been completed for use at the time that the 1975 age estimates were being developed but were used for the 1976 and 1977 estimates.

The computations were carried out separately for White and for Black and other races, but county race estimates were not available for use as controls. As an intermediate step, the computations by race were adjusted to be consistent with the 1975 State race estimates, but the county race detail is essentially an extension to 1975 of the 1965-70 migration trends shown by the 1970 census. It is recommended that only the data for all races be used in general analytical applications.

A special adjustment was made for migration caused by significantly large military installations, colleges, and correctional institutions.¹ This special migration was subtracted from total migration, removing it from the usual computation involving rates and proportions. Special immigrants for the 1970-75 period were estimated by adjusting the 1965-70 immigrants for change in the size of the special population

¹ Special migration for correctional institutions had to be estimated independently, whereas military and college migration were provided by the tabulation of 1965-70 migration data from the 1970 census. However, a county selected for a prison adjustment was treated exactly like a college county in the computational procedure.

from 1970 to 1975 as shown by administrative records. The adjustment technique was generally successful in allowing for the impact of changes in the size and age distribution of the military, college, and prison populations. A list of the counties selected for special treatment is given in appendix B. In all, 184 counties received special treatment for military population, 427 for colleges, and 70 for prisons.

For the counties with a special population, the civilian noncollege population² in 1970 was obtained by subtracting the tabulated special migrants from the 1970 census counts. This population was carried forward to 1975 with births, deaths, and civilian noncollege migration. The estimated special immigrants for the 1970-75 period were added to the 1975 civilian noncollege population to obtain the resident population. It is fundamental to this procedure that the special *population* is based on the number of *migrants* who reported in the census that they were in one of the special categories.

As a final step, estimates of the population aged 65 years and over based on Medicare data were substituted for those obtained by the regular cohort-component procedure.

Preparation of basic migration data, 1965-70. A special tabulation of 1970 census data was prepared showing immigration and outmigration for each county, by age, sex, and race. The original data were obtained by a sample question in the census asking for each person's residence on April 1, 1965, 5 years prior to the census date. The basic census data were adjusted for nonresponse by a special allocation technique, and a summary version of these data was published as Current Population Reports, Series P-25, No. 701.³ The tabulation identified separately the migration of persons in the Armed Forces or attending college in either 1965 or 1970. See appendix D for definitions of migrant types.

In developing the 1965-70 outmigration rates and immigrant proportions, it was necessary to adjust the migrant data in several ways. The most significant of these was the collapsing procedure used on small counties whereby irregular migrant totals for 5 year age groups were distributed to adjacent age groups, as described in detail in appendix A. This adjustment altered the age detail of migrants in small counties, but did not change the all ages total of outmigrants or immigrants for any race-sex group. The larger the number of migrants (all ages) the smaller the alteration was of the age distributions. However, for counties with small populations, the age detail of the final migrant distributions is relatively weak.

The collapsing procedure was needed because the original migration data were obtained from the 15-percent sample of the 1970 census. Each sample migrant received a weight of approximately 6, resulting in very irregular age distributions for small numbers of migrants. The census population based

on sample data was not available by race, and in the calculation of migration rates and proportions, complete-count population data were used, thereby complicating the effect of sample variation. The sample weight in the census was assigned according to the following broad age groups: under 5 years, 5 to 13 years, 14 to 24 years, 25 to 44 years, 45 to 64 years, and 65 years and over. As a result, the weighting of a sample case was not necessarily consistent with the complete-count population in a given 5-year age group.

As a preliminary step, the data were checked to see if military immigrants or college immigrants were greater than the resident population, and if so, the special migrants were adjusted to be no more than 75 percent of the population in a given age-sex-race cell. This limit was arbitrarily selected based on the idea that about 25 percent of a given cell should be civilian noncollege in order to provide a smoother year-to-year population change. Although the limit affected only a few cells in counties selected for a special adjustment, a more extensive study of the problem is needed. Civilian noncollege population and migrants were next computed by subtracting the special populations from resident data.

To adjust for the irregular age distributions mentioned above, the 5-year civilian noncollege data were collapsed to broader age groups similar to those used to determine sample weights in the census, and the migrants were redistributed to 5-year groups within the broad age groups according to population. Only counties with the smaller population groups (by race) were affected. If the total of male and female migrants for a racial group was 2,000 or more, no collapsing was necessary. The decision to collapse age categories was systematically determined by a statistical score measuring the extent of difference, age by age, between male and female migrants. Based on this score, both male and female distributions were collapsed to the broad age groups 5 to 14 years, 15 to 24 years, 25 to 34 years, 35 to 44 years, 45 to 64 years, and 65 years and over. If the migration distribution for these age groups was still irregular, one more collapse was made to the broad age groups 5 to 24 years, 25 to 44 years, and 45 years and over. A detailed discussion of the collapsing procedure is given in appendix A. Although a more extensive and systematic study of the operation of the collapsing routine is indicated, it smoothed migrant distributions satisfactorily in all observed cases.

In three special instances where extreme difficulties were encountered with the migration tabulations, substantial adjustments were made to the original 1965-70 migrant data. The areas are Chambers County, Ala.; Baltimore City and County, Md.; and New York City. The estimated population distributions by age are believed to have been improved by these adjustments; the total 1975 population is not affected. For more information on each area, see appendix C.

After all adjustments to the migrant data, civilian noncollege outmigration rates, by age, sex, and race, were calculated. For this purpose, a base population for each county was obtained by subtracting all immigrants from the 1970 resident population, adding all outmigrants, and subtracting military and college outmigrants. This population

² The term "civilian noncollege" as used in this section excludes the migrant population of prisons as well as of military bases and colleges.

³ The tabulation provided data for persons aged 5 years and over. Migration for the youngest cohort, births becoming 0 to 4 years at the end of the period, was estimated by a net migration technique. See section, "Birth cohort migration."

presents the survivors in 1970 of the civilian noncollege population residing in the county in 1965. Civilian noncollege outmigrants were then divided by the base population to obtain an outmigration rate. Excessive rates were frequently encountered where very small populations were involved, and were arbitrarily prevented from exceeding 90 percent.

All outmigrants, when summed for all counties, can be thought of as forming a national pool from which immigrants are drawn. As a first step in calculating immigrant proportions for each county, the national sum of civilian noncollege outmigrants was computed for each cohort. This pool was augmented by the sum of all military outmigrants, all college outmigrants, the Armed Forces overseas, and immigrants from abroad; and was diminished by the sum of all military immigrants and college immigrants. The civilian noncollege immigrants for each county were obtained for each age-sex category by subtracting military immigrants and college immigrants from total immigrants, and were then taken as a proportion of the national pool. The civilian noncollege immigrant proportions were then adjusted so as to equal unity for each age-sex-race cell.

Birth cohort migration. The gross migration data from the 1970 census do not provide information for the youngest cohort, that is, the migration of persons born during the 5-year base period, becoming 0 to 4 years at the end of the period. For this group, a rate of net migration was calculated by the formula:

$$r_{nm} = \frac{RP70_{0-4} - (B_{65-70} * NCSR)}{(B_{65-70} * NCSR)}$$

where r_{nm} is the rate of net migration, $RP70_{0-4}$ is the resident population aged 0 to 4 years in the 1970 census, B_{65-70} are births from 1965 to 1970 (April 1), $NCSR$ is a national Census Survival Rate, and $*$ is the symbol for multiplication. These rates were sometimes very high where small numbers were involved, and the net immigration rate was not allowed to exceed 100 percent. Larger areas rarely exceeded this figure. The final estimates for the population 0 to 4 years of age obtained by the method just described are not completely satisfactory. The net migration technique produced too many immigrants for counties with a substantial net immigration for the period 1965-70, and a higher immigration rate for 1970-75. For the extension of the estimates to 1977 an alternative approach resolved the problem by using the cohort-universe technique,⁴ but it was not feasible to correct the 1975 estimates.

Preliminary approximation of the 1975 population. To obtain the preliminary approximation for July 1, 1975, the census population in 1970 was carried forward to 1975 by cohort, by age, sex, and race, making separate estimates for births, deaths, and migration. A preliminary step calculated a new base date population for each county on July 1, 1970,

by a simple interpolation procedure between the April 1, 1970, census total county population and the postcensal estimate on July 1, 1973, as published in Current Population Reports, Series P-25, Nos. 649 through 698. The age-sex-race distribution on April 1, 1970, was adjusted pro rata to agree with this total. For Riley County, Kans., the total population of White males on July 1, 1970, was 30,385 by this calculation (table A, footnote 5).⁵ The census count on April 1, 1970, as adjusted for use in the population estimates program, had been 30,244.

The distribution of deaths by age and sex was obtained by first computing a preliminary estimate of deaths using death rates derived from the United States life table for 1972. The deaths by age-sex cohorts thus obtained were then adjusted pro rata to agree with registered totals, by race, for each county. The national death rates therefore served only to distribute deaths by age and sex. For Riley County, this method estimated 643 deaths for White males, of which 238 are for the cohort becoming 75 years and over in 1975 (table A, col. 2). A coverage adjustment ratio, by age, sex, and race, derived from national estimates of net census undercount, adjusted each cohort for difference in coverage by age as the cohort moved from one age to the next. This had the same effect as the inflation-deflation technique used in preparing the national population estimates, and assumes that the pattern of net census undercount for each county is similar to the pattern for the Nation. This assumption is open to question, and the use of the coverage adjustment ratio should be reexamined when and if more information is available regarding variation of rates of undercount for local areas. For Riley County, the largest adjustment was -253 for the cohort of White males becoming 25 to 29 years old in 1975 (table A, col. 3).

To complete the data preparation for obtaining the preliminary 1975 population, migration was first approximated for each county, by age, sex, and race, using procedures matching the preparation of the basic migration data for the period 1965-70. The rates of civilian noncollege outmigration calculated there (augmented slightly to provide for outmigrants to the Armed Forces overseas in 1975) were multiplied by the "survivors" in 1975 (the 1970 population less deaths and adjusted for coverage) to obtain civilian noncollege outmigrants. This computation was carried out for each county only after subtracting the 1965-70 military immigrants and college immigrants, aged 5 years, who now become military outmigrants and college outmigrants for the period 1970-75. It is a fundamental feature of the age estimates procedure that military and college migrants are assumed to be the entire special population. Thus the immigrants from the 1965-70 period are the special population in 1970, and become the special outmigrants for the 1970-75 period. This assumption functioned very satisfactorily in producing a reasonable age distribution for the special counties in 1975.

⁴ Irwin, Richard. "A Cohort-Universe Net Migration Procedure for Population Estimates and Projections by Age." Paper presented at the annual meeting of the Southern Regional Demographic Group: San Antonio, Texas, October 1978.

⁵ Riley County, Kans., was selected to illustrate the methodological procedures because it was designated as both a military and a college county, and these special populations were a relatively large part of the total population.

**Table A. Computation of Preliminary Population Estimate, by Age, for White Males, Riley County, Kans. :
July 1, 1970 to 1975**

(See text for derivation)

Age in--		Population July 1, 1970	Deaths	Coverage adjust- ment	Survivors July 1, 1975 ¹	Outmigrants			Immigrants			Residual ³	Population July 1, 1975 ⁴
1970	1975					Civilian ²	Military	College	Civilian ²	Military	College		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
All ages...	All ages..	532,504	643	-284	31,577	4,951	9,953	5,380	5,247	7,551	6,530	-1,240	30,621
Births, 1970-75	0 to 4 years..	2,119	29	-37	2,053	-	-	-	38	-	-	1	2,091
0 to 4 years...	5 to 9 years..	1,883	4	-2	1,877	1,259	-	-	1,006	-	-	-255	1,624
5 to 9 years...	10 to 14 years	1,769	3	24	1,790	801	-	-	602	-	-	-175	1,591
10 to 14 years...	15 to 19 years	1,664	6	-4	1,654	565	-	-	529	877	2,073	2,910	4,568
15 to 19 years..	20 to 24 years	4,306	27	-52	4,227	497	1,156	1,708	1,030	5,147	3,628	6,392	10,671
20 to 24 years..	25 to 29 years	11,277	72	-253	10,952	402	6,786	2,989	641	737	521	-8,531	2,674
25 to 29 years..	30 to 34 years	2,554	15	20	2,559	508	971	429	375	366	164	-983	1,556
30 to 34 years..	35 to 39 years	1,250	9	-2	1,239	237	482	135	318	217	59	-262	979
35 to 39 years..	40 to 44 years	1,026	11	10	1,025	174	286	49	216	124	44	-115	900
40 to 44 years..	45 to 49 years	867	16	-2	849	108	163	36	93	53	34	-129	722
45 to 49 years..	50 to 54 years	802	24	14	792	117	70	28	127	30	-	-44	734
50 to 54 years..	55 to 59 years	708	33	-2	673	66	39	-	75	-	-	-32	643
55 to 59 years..	60 to 64 years	585	43	-1	541	78	-	-	80	-	-	1	543
60 to 64 years..	65 to 69 years	522	56	12	478	69	-	-	37	-	7	-13	453
65 to 69 years..	70 to 74 years	375	57	-	318	16	-	6	47	-	-	25	343
70 and over....	75 and over...	797	238	-9	550	54	-	-	33	-	-	-30	529

- Represents zero or rounds to zero.

¹(4) = (1)-(2)+(3).

²Civilian noncollege.

³The "residual" is the sum of all cohort change other than deaths. (11) = (12)-(1)+(2).

⁴(12) = (4)-(5)-(6)-(7)+(8)+(9)+(10).

⁵Including births. Total excluding births is 30,385.

The civilian noncollege outmigrants for each county are summed to begin the formation of the national pool. The national sum of all military outmigrants and college outmigrants are added to the pool where they will be included in the immigrant distribution. The Armed Forces overseas in 1970 are also added to the pool, it being implicitly assumed that all will return to the United States in 1975. Net civilian immigration for the period 1970-75 is also added. Before distributing this pool as civilian noncollege immigrants, subtractions must be made to provide military immigrants and college immigrants in 1975 to all counties, and outmigrants to the Armed Forces overseas in 1975.

The subtractions from the pool for military immigrants and college immigrants in 1975 are the sum of the values for each county, calculated as follows. For the counties having significant military population, station strength, as reported by the statistical services of the Department of Defense, was obtained for July 1, 1970 and 1975. If total military immigrants for the county were less than station strength in 1970, military immigrants in 1975 (all classes) were estimated by multiplying military immigrants in 1970 by the ratio of 1975 to 1970 station strength. If military immigrants were greater than station strength in 1970, and if station strength increased, the amount of the increase was added to the 1970 figure to obtain the 1975 estimate. However, if station strength declined from 1970 to 1975, the ratio computation was used.

For counties with a significant college population, the procedure for obtaining total college immigrants in 1975 was similar to that for military counties. Using full-time enrollment in 1970 and 1975, college immigrants for 1975 were obtained by the same series of calculations just described for obtaining military immigrants from station strength data.

Having obtained figures for 1975 total military immigrants and total college immigrants in this way, college immigrants by age, sex, and race in 1975, were obtained by prorating the 1970 distribution to the new total. For military immigrants, however, an additional step was made to allow for the shift in the composition of the Armed Forces, by sex and race during the period 1970 to 1975. Specifically, the ratios of the 1975 to the 1970 resident Armed Forces, by race and sex, based on data from the national estimates program were: White males, .73; White females, 2.09; Black-and-other-races males, 1.18; and Black-and-other-races females, 3.68. The ratios for women indicate the striking increase in their numbers during the period. The 1970 military immigrant sex-race totals for each military county were multiplied by these ratios and then adjusted pro rata to the 1975 military immigrant total. A special function was included to dampen the effect of the large growth ratios for females in those few training bases where women make up a large proportion of station strength. Having obtained the 1975 military immigrant sex-race totals in this way, the age distribution in 1970 of each group was prorated to the new totals.

After the preliminary 1975 population data were examined, a distortion in age distributions caused by large prisons was noted, especially for Black and other races. This occurred because only a small proportion of the inmates were reported as outmigrants from the county containing the institution in the basic 1965-70 migrant data. For immigrants, however, there was reasonably complete reporting. The migrant data do not provide any special information about inmates of institutions because the 1970 census question on activity in 1965 covered only three categories; membership in the Armed Forces, enrollment in college, and employment. An estimate of migration for the period 1970-75 for

estimates of prisons (males only) was developed by assuming that the excess of male over female immigrants, age by age, in 1965-70 represented the impact of the prison on immigration. An adjustment was made for 70 counties with large prisons, and these counties were treated like college counties in the computational procedure. The prison adjustment alleviated the problem caused by deficient reporting in the original immigrant data, but sometimes fell short of the complete adjustment required. The adjustments for military and college population, however, functioned well in general, producing apparently reasonable age distributions.

Comparisons with special censuses were possible for a few counties with significant military and college populations. See "Evaluation and Limitations of the Estimates" and table H. Of the counties in table H, military adjustments were made for Pima, Ariz.; Kings, Calif.; San Bernardino, Calif.; Sarpy, Neb.; and Travis, Tex.; adjustments for colleges were made for Pima, Ariz.; Yolo, Calif.; and Travis, Tex. In the military counties, there was a tendency for the estimates of the age group 25 to 29 years to be low, perhaps due to a shift (not taken into account in the estimating procedure) towards an older age distribution in the Armed Forces.

Table A illustrates the values for military and college migration which were developed for Riley County. Columns 6 and 7 contain military and college outmigrant figures, respectively, for the 1970-75 period. Columns 9 and 10 give military immigrants and college immigrants for 1975 as calculated using the procedures described above. Station strength (all classes) as provided by the Department of Defense declined from 13,144 in 1970 to 11,117 in 1975, while full-time college enrollment increased from 12,943 to 15,711. In table A, the percent decrease from 9,953 (military outmigrants) to 7,551 (military immigrants) for White males is greater than the percent decrease in station strength because of the adjustment for change in the sex-race composition of the Armed Forces. The increase in college immigrants over college outmigrants is 21.4 percent, the same as the increase in enrollment.

In retrospect, it might have been advisable to adjust for the shift in the age structure of the Armed Forces. It was omitted from these experimental estimates because the shift might be specific to certain types of bases leaving others unaffected, and sufficient data for a thorough adjustment are not available.

The sum of military immigrants and college immigrants in 1975 for all counties was subtracted from the immigrant pool, by age, sex, and race, preparatory to distribution as civilian noncollege immigrants. The Armed Forces overseas were also subtracted from the pool, for which provision had been made by augmenting slightly the civilian noncollege outmigration rates for all counties.⁶ This feature was necessary because the basic 1965-70 migration data do not reflect the movement of U.S. residents to the Armed Forces overseas, as the information was tabulated for persons living

in the United States in 1970. Civilian noncollege immigrants were calculated for each county using the immigrant proportions developed for the 1965-70 base period. For the birth cohort, net migration was calculated using the rate previously developed, and the amount of net migration was entered as immigration or outmigration, depending on the sign of the net migration.

The preliminary approximation of the 1975 population was obtained for each cohort by subtracting deaths from the 1970 population, adjusting for coverage, subtracting civilian noncollege outmigrants, adding civilian noncollege immigrants, and adding or subtracting special migrants as appropriate. The cohort 0 to 4 years in 1975 (topmost cohort in table A) was obtained by a similar procedure, but starting with births from 1970 to 1975.

Adjustment for consistency with national estimates. The preliminary 1975 county population estimates were summed for the Nation, were compared with the national estimates by age, sex, and race, and were adjusted pro rata to obtain agreement. For all cells except those for the older Black-and-other-races population, the adjustment factors were small (table B). For Black-and-other-races females aged 75 years and over, a 12.9 percent upward adjustment was required, apparently because the life table death rate was too high relative to other rates for these races, and because the method of correcting for net census undercount does not exactly match the inflation-deflation technique used in preparing the national population estimates. The control to national totals adjusts for these biases to a considerable degree. For Black-and-other-races males in the oldest age group, the adjustment was 4.6 percent. The largest adjustment for Whites was 5.0 percent for females aged 75 years and over. For all of the other 31 age-sex-race cells for White males and females, the adjustment was less than 1 percent.

Adjustment for consistency with State and county estimates. Postcensal estimates for the total population of each county are available, as well as estimates by race for each State; the age detail was controlled to the 1975 estimates. The general procedure was to compare the population produced by the preliminary age approximation to the independent estimates of total population, and to adjust civilian noncollege gross outmigration and immigration, by age, sex, and race, so as to bring the revised total population into agreement with the postcensal estimate and at the same time produce the needed age-sex-race detail. The 1970-75 migration data for the special populations (military immigrants, etc.) were not affected by the adjustments.

The most logical and accurate manner for making such adjustments is a worthwhile subject for future major research. A functional relationship probably exists between (a) the amount of gross outmigration and immigration for a certain time period, (b) the gross migration for a succeeding period given a certain shift in the magnitude and direction of net migration, (c) the demographic characteristics of the migrants, and (d) the social and economic characteristics of the county in question. Other factors may be involved, such as the cost and characteristics of available housing.

⁶ The largest adjustment was for males aged 20 to 24 years in 1975 with an added outmigration rate of 1.9 percent for White and 3.1 percent for Black and other races.

Table B. Factors for Adjusting the Preliminary County Population Estimates to Agree with the National Population Estimates, by Age, Sex, and Race: July 1, 1975

(See text for derivation of factors. A factor of less than 1 indicates that preliminary data are decreased by the adjustment)

Age	White		Black and other races	
	Male	Female	Male	Female
0 to 4 years.....	.994	.992	1.013	1.005
5 to 9 years.....	.996	.996	1.000	.997
10 to 14 years.....	.993	.993	1.003	.998
15 to 19 years.....	.998	.999	1.008	1.003
20 to 24 years.....	1.005	1.004	1.018	1.009
25 to 29 years.....	1.005	1.006	1.009	1.011
30 to 34 years.....	1.004	1.003	1.013	1.007
35 to 39 years.....	1.002	1.001	1.004	1.003
40 to 44 years.....	.993	.993	1.001	.997
45 to 49 years.....	.995	.993	1.009	1.001
50 to 54 years.....	.999	.997	1.015	1.008
55 to 59 years.....	1.001	1.000	1.018	1.010
60 to 64 years.....	1.000	.999	1.007	1.001
65 to 69 years.....	1.000	1.002	1.014	1.018
70 to 74 years.....	.993	.999	.969	.978
75 years and over.....	1.007	1.050	1.046	1.129

Such an analysis was beyond the scope of this project, and in any case, gross migration data are not available for successive 5-year periods for a large group of counties to provide an easily accessible solution. The tabulation of county migration produced for this project was the first which provided complete data for counties. Even for local areas larger than counties, there are few, if any, data for two adjacent 5-year periods. A comparison of 1955-60 and 1965-70 data from the decennial censuses for State economic areas is a possible avenue of research, even though these are not adjacent periods. Data forthcoming after 1980 from the Administrative Records method will make it possible to compare gross migration data for 1970-75 and 1975-80 for local areas, derived from matched Federal income tax returns.⁷

In the absence of such analyses, rather arbitrary decisions were taken in order to provide a practical adjustment procedure in the short run for this project. Specifically, the sex-race totals of gross outmigration and immigration were adjusted in opposite directions by a simple relationship described below, so as to sum to the new desired net migration. Then the age distribution for each sex-race group from the preliminary approximation was adjusted pro rata to agree with the new total.

Perhaps the simplest functional relationship for adjusting the sex-race totals would have been to adjust the two streams in opposite directions by equal amounts to achieve the

desired net total. However, studies by Lowry and others⁸ have indicated that immigration is more responsive to varying economic opportunity than is outmigration. The problem being discussed here lends itself to this hypothesis; a shift in net migration for two successive time periods may be assumed to be related to a shift in economic opportunity, at least for those counties not primarily dependent on an adjacent county for their economic base.

This suggests that immigration should be changed more than outmigration to achieve a desired new net figure. For the solution needed immediately for this project, it was arbitrarily decided to change immigration by two-thirds of the required shift in net migration leaving one-third for outmigration. A comparison of gross migration totals, by race, for States for the period 1970-75 derived from matched income tax returns with 1965-70 migration data from the 1970 census gave some support to this assumption, but the disparate nature of the two data sources weakens the comparison, which in any case is for States, not counties. Nevertheless, the two-thirds, one-third rule appeared to be preferable to the assumption of equal changes or to a plus-minus adjustment, and was adopted for the project.

The availability of estimates by race for States raised the possibility of strengthening the race detail. Before comparing the preliminary total to the county postcensal estimate, the State totals by race produced by the preliminary approximation were compared to the State estimates, separately for

⁷ For a comprehensive description of the Administrative Records method, see U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 699. *Population and Per Capita Money Income Estimates for Local Areas: Detailed Methodology and Evaluation*. Spring, 1980.

⁸ See also Calvin Beale, *The Relation of Out-migration Rates to In-migration*, paper for the 1969 meeting of the Population Association of America; and Vern Renshaw, *The Relationship of Net Migration to Gross Migration*, paper for the 1977 meeting of the Southwest Economic Association.

White and Black and other races.⁹ The adjustment to net migration needed to achieve consistency was distributed among the counties on the basis of the volume of gross migration, since shifting migration trends were presumably the chief contributor to the disparity. In accord with the two-thirds, one-third concept, each county's share of the total State adjustment was based on the sum of two-thirds of gross immigrants and one-third of gross outmigrants, in comparison with similarly calculated weights for the other counties of the State.

This is shown as adjustment 1 in table C for Riley County, Kans. The amount of the adjustment was 421 for Whites (col. 2) and -281 for Black and other races (col. 3). The total adjustment is therefore 140, shown in column 1. This adjustment is added to the preliminary 1975 resident population,¹⁰ and the new total of 60,619 is now compared with the independent total population estimate. For Riley County this estimate is 61,093 (shown in the first column, bottom line), and the difference of 474 is shown as

⁹U.S. Bureau of the Census, Current Population Reports, Series 23 No. 67 *Population Estimates by Race, for States: July 1, 1973 and 1975*, February 1978.

¹⁰This 1975 figure for White males differs from the one given in table A by the amount of adjustment required to obtain consistency with the national population estimates.

adjustment 2. This amount is distributed by race using the weights previously described, and adjustments 1 and 2 are summed to obtain adjustment 3, the total adjustment needed to bring the preliminary approximation into agreement with the independent total population estimate. The race totals for adjustment 3 are now distributed by sex using a similar weighting system. By adding adjustment 3 to the 1975 preliminary population, the sex-race population totals for 1975 are obtained.

To obtain complete age detail, the outmigration and immigrant detail must also be adjusted. Preliminary civilian noncollege outmigrants and immigrants are shown in table C. The difference between these two figures (civilian net migration) differs from preliminary total net migration by (a) the migration of special populations, (b) the adjustment for coverage, and (c) the adjustment producing consistency with the national estimates. The migration of special populations is not changed by the adjustment to State and county controls. Only preliminary civilian noncollege outmigrants and immigrants are adjusted by adding two-thirds of adjustment 3 to immigrants and by subtracting one-third from outmigrants. The final outmigrants and immigrants also are shown in table C. The final resident population for each

**Table C. Components of Change and Migration Adjustments, by Sex and Race, for Riley County, Kans.:
July 1, 1970 to 1975**

(See text for description of procedure)

Item	All classes	Race		Race and sex			
		White	Black and other races	White		Black and other races	
				Male	Female	Male	Female
Resident population, 1970.....	57,052	52,418	4,634	30,385	22,033	3,329	1,305
Births.....	4,486	4,119	367	2,119	2,000	186	181
Deaths.....	1,199	1,157	42	643	514	31	11
Preliminary:							
Net migration.....	140	-645	785	-1,206	561	582	203
Percent ¹	0.2	-1.2	16.9	-4.0	2.5	17.5	15.6
Resident population, 1975.....	60,479	54,735	5,744	30,655	24,080	4,066	1,678
Civilian noncollege immigrants.....	14,550	13,234	1,316	5,247	7,987	484	832
Civilian noncollege outmigrants.....	14,097	13,053	1,044	4,951	8,102	333	711
Civilian noncollege net migrants....	453	181	272	296	-115	151	121
Adjustment 1.....	140	421	-281	(X)	(X)	(X)	(X)
Adjustment 2.....	474	434	40	(X)	(X)	(X)	(X)
Adjustment 3.....	614	855	-241	334	521	-85	-156
Percent ¹	1.1	1.6	-5.2	1.1	2.4	-2.6	-12.0
Final:							
Civilian noncollege immigrants.....	14,959	13,804	1,155	5,470	8,334	427	728
Civilian noncollege outmigrants.....	13,892	12,768	1,124	4,840	7,928	361	763
Net migration.....	754	210	544	-872	1,082	497	47
Percent ¹	1.3	0.4	11.7	-2.9	4.9	14.9	3.6
Resident population, 1975.....	61,093	55,590	5,503	30,989	24,601	3,981	1,522

X Not applicable.

¹Percent of 1970 population.

sex-race group is the 1975 preliminary population plus adjustment 3. The final net migration is the preliminary net migration plus adjustment 3.

While there is no assurance that the population totals by race in 1975 obtained by these procedures do indeed correspond to population levels, the shifts obtained appeared to be reasonable in light of other studies of migration trends. For example, for the White population in counties containing large metropolitan cities in the North and West, these procedures produced continued heavy White net outmigration. The previous net inmigration of Blacks to such counties tended to decline or become a net outmigration in the estimates. There was also a tendency for a shift toward more net inmigration of Black and other races to counties adjacent to such central counties of metropolitan areas. Although the adjustment procedure would be greatly strengthened by a reliable race estimate for each county, the impact of the State race estimate appeared to be beneficial in distributing the changes needed. Nonetheless, the final estimates by race produced by the project may be problematical, and the analytical use of these data is not encouraged. It is felt that the age estimates were improved by making the detailed computations by race, however. The estimates by age, sex, and race are available on computer tape, and can be obtained by writing to the Data User Services Division of the Bureau of the Census.

The use of the volume of gross migration as the basis for distributing the necessary adjustments had the beneficial result of providing enough migrants to withstand the adjustments required by large shifts in net migration. A number of possibilities were provided for in the computer program should the indicated adjustment exceed the number of migrants. Only one situation materialized in which adjustment was necessary, and only a few counties were affected. In this instance, a large upward adjustment demanded a decrease in outmigrants greater than the original number of outmigrants. In this event, the entire upward adjustment was made by increasing inmigrants. Another test was made to assure that civilian noncollege outmigrants did not exceed the base population used to generate the preliminary approximation.

Having obtained new totals for civilian noncollege inmigrants and outmigrants, they were distributed by age according to the preliminary migrant age distribution. (This assumption should be reconsidered in future age estimate projects, as a significant bias could be introduced by the simple proportional procedure used.) Revised estimates by age, sex, and race, were then computed for each county. The estimates were summed for all counties and for the second time were adjusted pro rata to agree with the national estimates by age, sex, and race. The adjustment factors were generally very small, the largest adjustment being 3.6 percent for Black-and-other-races males aged 25 to 29 years (table D). Of 64 age-sex-race cells, 55 had adjustments of less than 1 percent.

Use of Medicare data for estimating the population aged 65 years and over. Medicare enrollment statistics are available by county and are now being used to estimate change in the

total population aged 65 years and over for States and counties. For use in this special project, Medicare statistics by age, sex, and race, were provided by the Health Care Finance Administration, and the final population estimates in this age range were developed from these data. The general procedure was to adjust the age-sex-race detail of the 1970 census by the change in Medicare enrollment between 1970 and 1975, age by age. Since Medicare enrollment includes nearly all persons 65 and over, it was not expected that there would be any serious problems with this segment of the project. Medicare statistics have already been used extensively by the Bureau of the Census in its current estimates program and in the evaluation of census coverage in 1970 for the Nation¹¹ and for States.¹²

However, in using the Medicare enrollment data for these age-sex county estimates, a number of problems were encountered, some of which are still unresolved. The problems do not promise a simple solution; the census counts and Medicare enrollment are fundamentally inconsistent with each other in several ways, although the national totals for the two sources are nearly equal.

Total coverage. At the national level, the differences in total coverage are small. Some categories of persons are excluded from Medicare, and enrollment is not complete for some segments of the population eligible for the program. The largest exclusion from Medicare is aliens who have resided in the country for less than 5 years. Certain small groups of noncitizens are also excluded. Federal employees covered under the Federal Employees Health Benefit Act were originally excluded from Part A (hospital insurance), and although now permitted to enroll, they are not completely registered for Medicare. The total number in all of these categories was estimated to be 216,000 on April 1, 1970, as shown in a Census Bureau report.¹³ Table E compares Medicare enrollment after various adjustments to the Medicare total (as given in the report) to the 1970 census. In addition to the exclusions already cited, omissions of other persons was estimated to be 181,000 (low estimate). The estimate was obtained by assuming that registration for White males (after the adjustments in items 2a and 2b) was complete, and developing estimated omissions for the other sex-race groups by demographic analysis. The highest omission rate was for Black-and-other-races females. The subtraction of 119,000 in table E due to the method of age determination in Medicare is discussed in the next section.¹⁴

¹¹ U.S. Bureau of the Census, Census of Population and Housing 1970, Evaluation and Research Program, PHC(E)-4, *Estimates of Coverage of Population by Sex, Race, and Age: Demographic Analysis*, February 1974.

¹² U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 65, *Developmental Estimates of the Coverage of the Population of States in the 1970 Census: Demographic Analysis*. Washington D.C.: Government Printing Office, December 1977.

¹³ U.S. Bureau of the Census, Census of Population and Housing 1970, op. cit., footnote 11.

¹⁴ For a more detailed discussion than given here of these and other related issues, see Richard Irwin, "Aggregate Medicare Enrollment by Age, Sex, and Race as a resource in Analyzing Demographic Change for Local Areas". *Proceedings of the Workshop on Policy Analysis with Social Security Research files*. SSA-ORS Research Report No. 52: Washington, D.C., 1978.

**Table D. Factors for Adjusting the Revised County Population Estimates to Agree With the National Population Estimates, by Age, Sex, and Race:
July 1, 1975**

(See text for derivation of factors. A factor of less than 1 indicates that preliminary data are decreased by the adjustment)

Age	White		Black and other races	
	Male	Female	Male	Female
0 to 4 years.....	.998	.997	1.004	1.004
5 to 9 years.....	.994	.994	1.008	1.008
10 to 14 years.....	.994	.994	1.003	1.004
15 to 19 years.....	.995	.995	1.005	1.004
20 to 24 years.....	1.004	1.001	1.024	1.019
25 to 29 years.....	1.012	1.006	1.036	1.024
30 to 34 years.....	1.004	1.000	1.023	1.015
35 to 39 years.....	1.001	.999	1.017	1.010
40 to 44 years.....	.999	.998	1.010	1.006
45 to 49 years.....	.999	.998	1.009	1.007
50 to 54 years.....	.998	.998	1.004	1.006
55 to 59 years.....	.997	.997	1.002	1.004
60 to 64 years.....	.994	.995	1.001	1.004
65 to 69 years.....	.991	.995	1.001	1.003
70 to 74 years.....	.993	.997	1.000	1.002
75 years and over.....	.994	.998	1.001	1.003

Table E. Adjustments to Medicare Data and Comparison of Adjusted Data With the Census Count, for the United States: April 1, 1970

(Census is U.S. resident population aged 65 years of age and over. Figures in thousands. Due to individual rounding, the data do not sum exactly to the final estimate)

1. Medicare Enrollment, April 1, 1970 ¹	20,051
2. Adjustments for:	
a. Method of age determination in Medicare.....	-119
b. Aliens and Federal Employees not included in Medicare....	+216
c. Other persons not registered for Medicare.....	+181
3. Estimated Resident Population.....	20,328
4. Census Count.....	19,972
5. Estimated Net Census Undercount.....	356
Percent.....	1.3

¹Average of January 1, 1970 and July 1, 1970 data.

Source:

Census of Population and Housing: 1970.

Evaluation and Research Program, PHC (E)-4.

"Estimates of Coverage of Population by Sex, Race, and Age: Demographic Analysis." Table D, p. 17.

Federal employees are somewhat concentrated in the Washington, D.C., area and retirees not enrolled in Medicare could affect the estimates for the surrounding counties. Immigrants who arrived recently are also not evenly dispersed geographically and may have an impact on local estimates, although only about 65,000 aliens over age 65 were residents of the United States in 1970.¹⁵

The adjustments shown in table E usually cannot be made with precision for counties, and in this project, no attempt was made to adjust the Medicare data for the categories shown in the table. The tabulated Medicare total without adjustments was only 0.4 percent above the 1970 census count. For some individual counties, however, the impact of the excluded categories can be more significant.

Age. There are substantial differences by age between the two sets of data. The age determinations in Medicare are quite accurate, since the determination of the date of birth of a person applying for Social Security retirement benefits or for Medicare coverage is determined by a relatively rigorous procedure. A study conducted by the Social Security Administration in 1967 showed that the net error in the determination of age at the time a new application for retirement benefits is made (usually very close to the 65th birthday) is very small.¹⁶ In the early years of the program, persons presumed to be well over age 65 may have been added to the Medicare universe with a less rigorous procedure for determining age.

The accuracy of age data in a census depends on the precision with which the respondents report their age. The 1960 and 1970 U.S. census effected a substantial improvement over earlier censuses in age reporting by asking each respondent to report date of birth. There are still some problems in the age data for the elderly, however, especially at or near age 65.

A comparison of July 1, 1970, Medicare data, by age and sex, with national population estimates (based on the April 1, 1970, census count) shows the estimates to be higher than Medicare for the age group 65 to 69 years, lower for ages 75 to 84 years, and about the same for the groups 70 to 74 years and 85 years and over (table F). For the all ages total, the difference is small for both males and females. The differences in table F are largely due to the net effect of census under-enumeration and net misreporting of age, but omissions in the Medicare data also contribute to the deviations shown.

One peculiarity of Medicare data by age probably does not cause much error in local population estimates. Due to administrative requirements, Medicare data as of any specified date include persons who attain age 65 during the month *following* the reference date. Thus the total universe always includes a few persons who are still 64 years of age by census definition. This also affects subgroupings by age, in that for

any defined age range a tabulation of Medicare enrollees will *include* persons up to 1 month younger than the defined lower limit and at the older end of the age range will *exclude* persons up to 1 month younger than the upper limit. On April 1, 1970, the number of persons included in the Medicare tabulation but not yet 65 years of age was estimated to be 119,000, as shown in table E. Since this feature is common to all local areas, no appreciable error to the county estimates is involved.

Race. There are a number of problems in using race data from the Medicare file in conjunction with census data for persons over 65 years of age. Only the age and sex estimates are recommended for general use, and they are only very slightly affected by these problems. The basic computations were carried out by race, however, and persons with race not specified in the Medicare data were excluded from the computation of the 1975 estimates.¹⁷ In 1970, 2.1 percent of all males and 3.3 percent of females are shown as unknown race in Medicare tabulations. In 1975, the figures changed only slightly to 2.3 and 3.0 percent. The exclusion of unknown race from the calculation did not affect the general level of the estimates for the age group 65 years and over, because the detailed calculations were adjusted to agree with a computation for the group as a whole, taking into account all persons enrolled for Medicare. For the 1976 and 1977 estimates, an improved procedure was adopted which distributed the "race unknown" category.

Definition of residence in Medicare. Tabulations of Medicare data for local areas are developed using codes for State and county of residence contained on each record of the basic computer file. These codes are assigned from responses to a residence question on the application form for Medicare entitlement. In case of nonresponse, a coding guide is used to assign the State and county residence code on the basis of the residential address in the file. Although many Social Security beneficiaries have their monthly benefit transmitted directly to a bank, the Medicare file carries an additional residential address for these persons.

Tabulations of Medicare enrollment are regularly prepared for States and counties as of July 1 of each year. With over 22 million records, however, considerable time is needed to update the file for a given reference date, especially since late applications by persons just reaching retirement age are not unusual. As a result, a definitive tabulation is prepared approximately 9 months after the reference date. For example, a tabulation showing enrollment as of July 1, 1970, will actually be run on the computer on or about April 1, 1971. The addition of new beneficiaries reaching age 65 and the deletion of deceased persons are not allowed to affect the totals as of the reference date, but address changes during the 9 month period are reflected in this tabulation. As a result, the reference date with respect to place of residence may be closer to April 1, 1971, than to the stated reference date of July 1, 1970.

¹⁵ Unpublished estimate developed for the estimates of census coverage in U.S. Bureau of the Census, *Census of Population and Housing, 1970*, op. cit., footnote 11.

¹⁶ Social Security Administration, Office of Research and Statistics, *Report on Policies and Procedures for Establishing Initial Entitlement to OASI Benefits*, April 1967.

¹⁷ For a discussion of the race classification in the Medicare data, see Richard Irwin, op. cit.

Table F. Difference Between Medicare Enrollment and Estimated Population, by Age and Sex, for the United States: July 1, 1970

(Population and Medicare enrollment in thousands. Age data may not sum to column totals due to individual rounding)

Age and sex	Estimated population ¹	Medicare enrollment	Difference	
			Number	Percent
	(1)	(2)	(3)=(2)-(1)	(4)=(3)÷(1)
BOTH SEXES				
65 and over.....	20,087	20,135	48	0.2
65 to 69.....	7,023	6,777	-246	-3.5
70 to 74.....	5,465	5,453	-12	-0.2
75 to 79.....	3,859	4,071	212	5.4
80 to 84.....	2,309	2,393	84	3.6
85 and over.....	1,432	1,441	9	0.6
MALE				
65 and over.....	8,407	8,376	-31	-0.4
65 to 69.....	3,137	3,059	-78	-2.5
70 to 74.....	2,322	2,306	-16	-0.7
75 to 79.....	1,568	1,624	56	3.6
80 to 84.....	882	899	17	1.9
85 and over.....	497	488	-9	-1.8
FEMALE				
65 and over.....	11,681	11,759	78	0.7
65 to 69.....	3,885	3,718	-167	-4.3
70 to 74.....	3,143	3,147	4	0.1
75 to 79.....	2,290	2,447	157	6.8
80 to 84.....	1,427	1,493	67	4.7
85 and over.....	935	953	18	1.9

¹The April 1, 1970, census count carried forward 3 months by the national estimates procedure.

Source: Unpublished tabulation of Medicare enrollment for July 1, 1970. Census data are from U.S. Bureau of the Census, Current Population Reports, Series P-25 No. 614.

There is no way to resolve this situation completely. However, retired persons who move to a new area may not have their address in the Social Security file changed immediately. To the extent that there is a delay in the address change, the error in assignment of residence caused by the 9-month lag would be reduced. Furthermore, the rate of net migration is not high for elderly people, even at or near the usual retirement age of 65 years. In March 1976, 2.1 percent of the population aged 65 and over had been living in a different county 1 year earlier.¹⁸ The situation remains a problem, however.

Another problem in using Medicare data in conjunction with census data is caused by persons with dual residence. If a retired person from a northern State spends the winter in a southern State, but retains a residential address in the original State, this person might well be enumerated as a

resident of the southern State in the census, while the Medicare file still carries the address in the northern State. Whatever the reason, Medicare data for the White population are decidedly below the census levels in the retirement States of Florida and Arizona.¹⁹ In a number of States with cold climates (Michigan, the Dakotas, northern New England), Medicare for Whites is higher than the census count.

For Black and other races the pattern is different, and in northern States, Medicare is substantially below census. The net overstatement of age mentioned earlier in the census for age 65 could in part account for these differences. In contrast, the southern States have relatively higher Medicare enrollments for Black and other races, especially for females. The chief elements which would produce such differentials are (a) unknown race, (b) underenumeration and/or net overstatement of age in the census, (c) inconsistency between

¹⁸U.S. Bureau of the Census, Current Population Reports, Series P-20, No. 305. *Geographical Mobility: March 1975 to March 1976*, January 1977, p. 46.

¹⁹U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 65. *Developmental Estimates of Coverage of the Population of States in the 1970 Census: Demographic Analysis*, December 1977, p. 76. See also Richard Irwin, op. cit.

the census definition of residence and the Medicare address, and (d) inconsistency between the race designations in the two data sources. The data for Whites are presumably influenced by the same considerations, but to a smaller relative degree.

Medicare data for counties. The preceding material gives an idea of the source and extent of differences between census and Medicare data at the national and State level. The county level introduces a new element in that there may be substantial variation among counties in completeness of coverage in the Medicare program and the census, and in the impact of the various other sources of difference between the two data sets. It is possible that differences are concentrated in a relatively few counties, while in a majority of counties correspondence between the two sets is excellent.

To examine this hypothesis, a distribution of counties by percent difference between the census counts and Medicare enrollment was tabulated by sex and race (table G).²⁰ For White males, the difference was less than 5 percent in 1,743 counties. These amount to 56 percent of all U.S. counties with at least 30 Medicare enrollment; in 91 percent of the counties, the difference was less than 15 percent. The

²⁰ The Medicare data used to prepare table G include only those persons for whom race and county or residence is specified, and on the average Medicare would be about 2 percent low for males and 3 percent low for females.

percent difference was over 25 in 100 counties. For White females there is a stronger correspondence between the census and Medicare figures.

The distribution for Black and other races is not as encouraging. In only 28 percent of the counties (with 30 or more Medicare enrollment) was Medicare for males within 5 percent of the census count. For females, the figure is a little higher at 31 percent, but for both males and females, there are differences of over 25 percent in a substantial number of counties. The downward bias of Medicare statistics for Black and other races is widespread. For males, in 53 percent of U.S. counties the Medicare data are 5 percent or more below the census figures, as compared to only 19 percent for which Medicare statistics are 5 percent or more above the census count.

Coding. In addition to the sources of differences between census counts and Medicare enrollment already mentioned, at the county level the geographic coding in the Medicare system is an important factor.

Persons actually residing in a ring county of a metropolitan area, but near the county line separating them from the central county, may be improperly coded as being residents of the central county. This type of "cross-over" coding error was found in a number of counties in comparing 1970 Medicare and census data.²¹

²¹ Irwin, Richard, op. cit.

Table G. Distribution of Counties by Percent Deviation of Medicare Enrollment From Census Counts, by Sex and Race: 1970

(Census counts are base of percent deviations; a minus deviation indicates Medicare is less than census. Percents may not sum to total due to independent rounding)

Race and sex	Counties with 30 or more Medicare enrollment							
	Total	Percent deviation of Medicare from Census						
		-25 and over	-15 to -24.99	-5 to -14.99	Less than 5	+5 to +14.99	+15 to +24.99	+25 and over
NUMBER								
White:								
Male.....	3,109	66	129	601	1,743	470	66	34
Female.....	3,109	49	88	556	1,841	467	62	46
Black and other races:								
Male.....	1,466	152	190	434	412	164	36	78
Female.....	1,481	145	215	367	458	195	53	48
PERCENT DISTRIBUTION								
White:								
Male.....	100	2	4	19	56	15	2	1
Female.....	100	2	3	18	59	15	2	1
Black and other races:								
Male.....	100	10	13	30	28	11	2	5
Female.....	100	10	15	25	31	13	4	3

Source: Unpublished tabulation comparing Medicare data for July 1, 1970, (excluding unknown race or county) with the census count as of April 1.

In a systematic review of counties with differences of 25 percent or more between the 1970 census and Medicare enrollment, 69 of these counties were found to have an apparent cross-over with an adjacent county. Of the 69 counties, 25 are in Virginia, the State with the most serious errors. However, the problem is widespread; the remaining 44 counties are located in 18 different States. Most of these counties are adjacent to a county containing a relatively large city, and do not have large populations.

The impact of this phenomenon varies greatly and may cause a serious error in estimating population, even when only the change in Medicare is used to update the 1970 population count. In order to mitigate the impact of improper coding and the other inconsistencies between Medicare and census data, the formula for estimating population was modified from that used in the ongoing current estimates program for county population. For the current estimates, the population aged 65 and over is estimated by *adding* change in Medicare to the 1970 census count. For these estimates by age, sex, and race, this was done only when Medicare in 1970 was less than the census count. If Medicare was larger than census, the *rate* of change in Medicare was multiplied by the census population in 1970 to obtain change in population. These two procedures select the minimum change in population obtained by the two alternative methods. However, some of the impact of this new procedure was lost when the age-sex-race estimates were controlled to the independent estimate of county population, and the coding problems still produced apparently erroneous estimates in a number of counties. Interestingly enough, the estimated population over age 65 was not always biased by such discrepancies; in many cases the *change* in Medicare appeared to be about the same as would be developed from more precisely coded Medicare data. However, there were still obvious errors in the 1975 estimates for a number of areas. For 1976 and subsequent years an alternative procedure was introduced for the areas most seriously affected, and the estimates for the aged population developed by the cohort-component procedure were retained for the following counties:

Georgia - Baker, Crawford, Jones, Oglethorpe

Mississippi - Rankin

North Carolina - Edgecombe, Nash

Ohio - Holmes

Virginia - Alleghany, Bedford, Fairfax, Henry, James City, Nansemond, Roanoke, Rockingham, Spotsylvania, Stafford

Virginia (Independent Cities) - Bedford, Covington, Fairfax, Falls Church, Fredericksburg, Galax, Harrisonburg, Martinsville, Roanoke, Suffolk, Williamsburg

Nansemond and Suffolk are included in this list because of problems with the basic data series, and Williamsburg and James City were added because the Medicare data used in

preparing the total population estimate for the Federal-State Cooperative Program for Population Estimates (FSCP) were specially adjusted. The rest of the counties were selected by the following criteria:

1. The county is part of a group of two to four adjacent counties, at least one of which showed a deviation in 1970 of 25 percent or more between the census count of persons aged 65 years and over and Medicare enrollment.
2. There were opposite deviations of approximately equal size observed in adjacent counties, suggesting a coding problem in the Medicare data.
3. Substituting the cohort-component calculation for the suspect Medicare-based estimate caused a change of 10 percent or more in the estimated population aged 65 years and over.

In using the 1975 age estimates for all of the counties listed, it is advisable to combine them with one or more adjacent counties to mitigate the effect of the coding problems.

Another problem occurred in utilizing the Medicare data that required adjustment. The first county of each State tended to have a much larger Medicare count for unknown race in 1975 than in 1970. The data processing programs incorrectly assigned new enrollees with incomplete information to the first county in the State. This situation has been corrected, but it was not possible to recreate the tabulations for previous years, and the 1975 estimates are affected by the problem. For the age estimates in 1976 and subsequent years, the original cohort-component estimates were retained for those first counties where the Medicare-based estimates required an adjustment of 10 percent or more. The counties involved are: Appling, Ga.; Adams, Ind.; Allen, Kans.; Adair, Ky.; Adair, Mo.; Adams, Ohio; Adams, Pa.; Anderson, Tex.; Beaver, Utah; Adams, Wash.; Barbour, W. Va.; and Adams, Wis.

After calculation of the population estimates in 1975 for all age-sex-race cells over age 65, the estimates for each county were adjusted pro rata to agree with the independent estimates for ages 65 years and over as a group, and the detailed estimates were substituted for those calculated by the cohort-component procedure. The difference between the cohort-component estimate and the Medicare-derived estimate for each sex-race group was distributed pro rata to the population under 65 years, in order to maintain the agreement of the total of the age detail with the independent estimate of total population.

EVALUATION AND LIMITATIONS OF THE ESTIMATES

The 1975 county age estimates are considered experimental because they involve the application of new techniques, and because it has not yet been possible to compare the estimates systematically with decennial census data. Comparisons have been made with special census data, as available (table H), but except in California, relatively few complete counties conducted special censuses during the

1970-75 period. For some special censuses conducted by the U.S. Bureau of the Census, age distributions could not be obtained; the age detail is published only for areas with 50,000 or more inhabitants. The table gives comparisons for 14 federally conducted censuses, 8 conducted by the State of California, and 1 by the State of Washington.

The State-conducted censuses are of high quality, and are accepted by the Bureau of the Census for official purposes. For some California counties, however, age detail was not obtained for military bases and large institutions, and the published age data show these as age unknown. All California counties shown in the official State report for July 1975²² for which complete age detail was provided are included in table H.

The table shows the average errors for 15 age groups (5-year age groups to age 65 years, continuing with 65 to 74 years, and 75 years and over), by sex. Also shown are the number of age groups with errors of less than 5 percent, 5 to 9.9 percent, and 10 percent and over. The average error for all 23 counties was 6.5 percent for males and 5.9 percent for females. The two smallest counties (Logan and Arthur counties, Nebraska) have large percent errors, however, and if

these two counties are excluded, the average error for the 21 largest counties drops to 5.0 percent for males and 4.4 for females. For these 21 counties, 187 age groups for males out of the total of 314 (60 percent) show errors of less than 5 percent. The corresponding figure for females is 65 percent. The large average errors for the two smallest counties are not unexpected, as the number of persons in each age group is very small. For such small counties it is advisable to combine the detailed data into broader categories.

Even excluding the two smallest counties, however, table H shows a tendency for the smaller counties to have somewhat larger average percent errors. Pasco County, Fla., is an exception to this rule, having large average errors (8.3 and 5.7 for males and females, respectively), yet its special census population was over 100,000. A contributing factor to these errors is the very rapid population growth of the county since 1970. The county had a net immigration rate of 50 percent for the period April 1, 1970, to July 1, 1973.²³

The errors shown in table H implicitly assume that the postcensal estimate of total population is consistent with the special census count. For the comparisons in the table, this

²² California State Department of Finance. *Census Report*. Sacramento, California, July 1976.

²³ U.S. Bureau of the Census, Current Population Reports, Series P-26, No. 90. *Estimates of the Population of Florida Counties and Metropolitan Areas; July 1, 1972 and 1973, October 1974.*

Table H. Summary of Average Percent Errors by Age of County Estimates From Special Censuses, by Sex: 1974 to 1976

(Data relate to 15 age groups (5-year age groups to age 65 years, continuing with 65 to 74 years, and 75 years and over), except for Santa Clara County, Calif. (5-year age groups to age 65 years, then 65 years and over))

State and county	Special census		Males				Females			
	Date	Population	Average error ¹ (%)	Number of errors ¹			Average error ¹ (%)	Number of errors ¹		
				Under 5%	5% to 9.9%	10% and over		Under 5%	5% to 9.9%	10% and over
Santa Clara, Calif.....	4/1/75	1,169,006	3.8	10	4	-	3.9	8	6	-
San Bernardino, Calif.....	4/1/75	696,094	3.4	11	3	1	2.6	14	-	1
Contra Costa, Calif.....	4/7/75	582,722	4.4	11	2	2	4.6	9	4	2
Pima, Ariz.....	10/20/75	449,544	4.1	9	5	1	4.5	7	8	-
Fresno, Calif.....	9/1/74	440,467	4.0	10	4	1	3.4	13	1	1
Travis, Tex.....	4/20/76	373,275	3.9	12	2	1	3.4	10	4	1
San Joaquin, Calif.....	10/6/75	299,831	3.8	10	4	1	3.8	14	-	1
Pasco, Fla.....	3/21/73	108,865	8.3	4	8	3	5.7	7	6	2
Yolo, Calif.....	4/7/75	100,778	4.9	6	8	1	4.5	9	5	1
Placer, Calif.....	7/10/75	90,975	6.0	6	7	2	5.3	7	8	-
Wayne, N.Y.....	4/22/75	82,194	2.9	14	-	1	1.8	13	2	-
Sarpy, Nebr.....	7/15/74	73,479	7.9	5	6	4	5.2	10	3	2
Eau Claire, Wis.....	3/31/75	72,237	2.4	14	1	-	3.1	13	2	-
Cowlitz, Wash.....	9/13/73	70,384	3.3	11	4	-	2.3	14	-	1
Putnam, N.Y.....	4/14/75	68,765	5.9	9	3	3	5.6	7	6	2
Kings, Calif.....	10/4/74	67,993	6.3	6	6	3	4.4	10	3	2
El Dorado, Calif.....	7/10/75	59,219	4.6	10	4	1	7.2	7	4	4
Bonneville, Idaho.....	11/5/75	58,499	4.8	8	6	1	2.9	13	2	-
Sutter, Calif.....	6/10/75	46,003	4.6	8	6	1	5.6	9	4	2
Nevada, Calif.....	7/10/75	33,949	8.4	5	3	7	6.6	4	10	1
Dakota, Nebr.....	5/13/76	16,282	6.7	8	3	4	6.6	6	7	2
Logan, Nebr.....	8/14/75	1,031	17.2	-	4	11	16.4	1	4	10
Arthur, Nebr.....	8/21/75	565	27.9	2	1	12	26.8	4	-	11
Total (23 counties).....	(X)	(X)	6.5	189	94	61	5.9	209	89	46
Total (21 largest counties)...	(X)	(X)	5.0	187	89	38	4.4	204	85	25

- Represents zero.

X Not applicable.

¹Without regard to sign.

could not be avoided, because the age estimates are automatically adjusted to agree with a computer file containing the regular postcensal estimate, and this estimate has already been adjusted to agree with special census results. The agreement between the total of the age estimates and the special census total tends to minimize the error of the individual age cells. The minimizing effect is not as great as might be expected, because a shift in the overall level of one of the distributions increases the deviations for some age groups and decreases others. Nonetheless, the errors of the age detail for a county without a special census would tend to be larger than those shown in the table. The errors shown do, however, measure the degree to which the relative distribution by age and sex of the estimate differs from the distribution shown by the special census.

The comparisons in table H are not necessarily indicative of the accuracy of the entire set of county estimates. Most of the censuses were ordered and paid for by the county itself in the expectation of showing an increase in population over the 1970 census.²⁴ The errors shown in table H therefore cannot be assumed to be valid for counties with little or no population growth.

Probably the major factor affecting the accuracy of the age estimates is the implicit assumption that the age pattern of county gross outmigration and immigration for the period 1965-70 as shown by the 1970 census is representative of the pattern for 1970-75, after adjustment for change in the level of net migration. For very small counties, sample variation of the migrant data is also a source of error. Other factors are the estimates of deaths by age and net census undercount. The coverage adjustment procedure used for the age estimates assumes that the pattern of net census undercount for each county, by age, sex, and race, is similar to the national pattern. Taking all of these factors into consideration, the average error shown by the comparisons in table H is not excessive. If a subsequent full test against the 1980 census confirms this general level of accuracy for counties with medium to large population, the basic procedure adopted for the age estimates can be assumed to be sound.

A number of special situations should be noted. The estimates for Alaska and Hawaii are weaker than those for other States due to special problems relating to geography, identification of race, and military population. Problems were also encountered in counties with small populations, but these tended to be associated with the race detail, usually for Black and other races. The errors are almost always small, and do not seriously distort the data for all races combined as presented in this report, except in a few cases. In Angoon, Alaska, there is an overestimate of the female population of Black and other races which is easily observable in the combined data. This was caused by an uneven sample distribution of migrants, by sex, in the original census data, magnified by a very sharp upturn in population growth in the 1970-75 period.

²⁴ The special census for Travis County, Tex., was conducted by the Bureau of the Census as a pretest of 1980 decennial census procedures.

A similar sampling accident affected one age group for Black and other races in Val Verde County, Tex. This county contains a military base and was designated a military county. An uneven sample distribution of military immigrants resulted in a sharp drop in the resident male population of Black and other races aged 25 to 29 years between 1970 and 1975. This error is hardly observable in the data for all races since the Black-and-other-races population is a small proportion of total population in this county. In general the collapsing procedure took care of such problems but military counties were excepted, as discussed in appendix A.

A problem of a different type affects the estimates for the counties of Sebastian, Ark., San Diego, Calif., Okaloosa, Fla., and Lebanon, Pa. In 1975, these counties contained sizeable relocation centers for Vietnamese refugees, who were included in the estimate of total population to which the age data were controlled. The data needed to make a special adjustment were not available, and the counties were handled with standard procedures. As a result, the race distribution of the 1975 estimates does not reflect the race of the Vietnamese refugees, and the age distribution in 1975 may be affected as well.

The estimates for Richmond City and Chesterfield County in Virginia are affected by a large annexation which added about 47,000 persons to the city shortly before the 1970 census. This situation caused an overstatement of outmigration from Chesterfield County in the 1970 census tabulations, because persons who had migrated out of the annexed area to other parts of the Nation naturally tended to report in 1970 that in 1965 they had lived in Chesterfield County. For analytical purposes, these persons should have been considered to be outmigrants from Richmond City, and the migrant data as tabulated show an incorrect level of net migration for both the city and county. In preparing the age estimates, this bias resulted in large adjustments to the preliminary approximations of the 1975 population. The Chesterfield County adjustment of 25 percent of total population was particularly prejudicial to the final estimates of the age detail of migrants. It is advisable to combine the estimates for these two counties.

This type of error will occur wherever the geographical boundaries of a county or county equivalent are changed during the period covered by the census migration question. The Richmond-Chesterfield situation is by far the largest which affected the 1965-70 data, but other areas, especially in Virginia, were similarly involved.

The very large number of data cells for the entire set of 3,141 counties has made it impossible in a practical sense to review the data thoroughly for every county, and there may be as yet undetected questionable results. A substantial number of counties have been reviewed, however, and a special consistency check has been made for *all* counties for selected age groups, by sex and race. The consistency check compared the 1970-75 estimated change in population with the 1950-60 and 1960-70 intercensal change, and identified outliers.²⁵ The outliers were almost always found to result

²⁵ This consistency check was carried out by the National Cancer Institute, which provided major funding for the county age estimates project.

from real changes in trend rather than weaknesses in the methodology. The number of outliers was not excessive, except in the group 0 to 4 years. The consistency check revealed that the estimates for this age group were on the high side in about 10 percent of U.S. counties. Subsequent study revealed that the use of net migration rather than gross migration for the birth cohort caused a high estimate for counties with a high net immigration for the period 1965-70 and a continued or accelerated rate for the 1970-75 period. The other age groups checked did not reveal any similar large-scale biases. The age groups covered in this check were 0 to 4 years, 15 to 19 years, 20 to 24 years, 55 to 59 years, 60 to 64 years, 65 to 69 years, and 85 years and over; each age group was run separately for the four sex-race categories.

As a result of the various reviews, it is not believed that any pervasive biases not already identified are inherent in the data. The exact degree of overall error is, however, unknown; and there are undoubtedly many specific situations where a particular age cell is significantly in error. Users are cautioned from placing too much reliance on results for specific age categories, even though the general level of error may be acceptable for use of the figures in trend and pattern analyses.

RELATED REPORTS

The 1970 census gross migration data used to obtain migration rates and proportions for preparing the county age estimates were developed by a special project. See U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 701. *Gross Migration by County: 1965 to 1970*.

The estimates of county, State, and national population to which the 1975 estimates were controlled are as follows:

- (County) Current Population Reports, Series P-25, Nos. 649 through 698. *1973 (revised) and 1975 Population Estimates and 1972 (revised) and 1974 Per Capita Income Estimates for Counties and Incorporated Places*.
- (State) Current Population Reports, Series P-23, No. 67. *Population Estimates by Race, for States: July 1, 1973 and 1975*.
- (Nation) Current Population Reports, Series P-25, No. 721. *Estimates of the Population of the United States by Age, Sex, and Race: 1970 to 1977*.

Appendix A. Collapse Procedure for Smoothing Migrant Age Distributions

The basic migration data used in the county age estimates project were obtained from a question in the 1970 census on residence 5 years prior to the census date. This question was part of the 15-percent sample. Each person in the sample was assigned a sample weight of approximately six, and the sample migrant data were inflated by these weights to provide an estimate of the total number of migrants. For large counties, only a few problems were encountered in using the resulting migration data. For small populations, however, the age distributions were very irregular. For example, a county with only 2 sample migrants for a sex-race category would have a total of about 12 migrants, but they would be concentrated in only two of the 5-year age groups, with zero migrants in all other age groups. If it had been possible to use the sample *population* to compute migration rates, the problem may have been less pronounced, as the sample population would have tended to have the same weight as the migrants. The sample population could not be used, however, as it was never tabulated from the basic census records for counties by race.

In order to smooth the irregular age distributions of migrants for small populations, the 5-year age data for both population and migrants were collapsed to broader age groups. Within each broad group, the migrants were distributed back to 5-year age groups according to population. The implicit assumption is that the 5-year age groups all have the migration rate of the broader group.

The decisions to collapse age categories were systematically based on a sex ratio score (SRS) which provided an index of the degree to which male and female migrants differ, age by age, for the entire distribution. This criterion takes advantage of the strong tendency for migrants to be about evenly divided between the sexes, age by age, in most situations. Because some types of military installations give rise to a sharp exception to this rule, data for counties designated as military were not collapsed.

The assumption that male migrants should be approximately equal to female migrants seemed preferable to curve-fitting criteria which would attempt to classify the age distribution itself as being satisfactorily smooth. Many situations produce skewed age distributions of migrants in various patterns, making it a complex problem to establish criteria for identifying age distributions which are to be smoothed. The bimodal character of many county migrant age distributions, with a peak in the twenties or thirties and

another peak for very young children, makes it more difficult to decide whether a given age distribution should be smoothed. The notion that male and female migrants ought to be approximately equal provided a simpler basis for deciding whether to collapse to broader age groups. Although more study is needed on the impact of the collapsing routine on the various county age distributions, in all observed cases the smoothed distributions were an improvement over the original data.

The SRS was calculated separately for White and Black and other races by the formula:

$$SRS = \left[\sum_1^n \frac{(M * F)}{(M + F)} \right] * 4 \div \sum_1^n (M + F)$$

where n is the number of age groups in the distribution, M and F are male and female migrants in each age group, and $*$ is the symbol for multiplication. The SRS varies from 1 (male migrants exactly equal to female migrants in all age groups) to zero (no age group has both male and female migrants.)¹

If the SRS was less than .90, the distribution was collapsed to the age groups 5 to 14 years, 15 to 24 years, 25 to 34 years, 35 to 44 years, 45 to 64 years and 65 years and over. Where very few sample migrants were involved, it was necessary to collapse the age distribution to even broader age groups, that is 5 to 24 years, 25 to 44 years, and 45 years and over. This procedure was used if the SRS after the first collapse was less than .87. The collapse decisions were subject to the following conditions:

1. The SRS for in-migrants determined the collapse for both out-migrants and in-migrants.
2. If the sum of male and female migrants (separately by race) was less than 200, the distributions were collapsed once, regardless of SRS.
3. If the sum of male and female migrants was 2,000 or more (separately for each race), no collapsing was permitted.
4. If a county was designated as military, no collapsing was permitted.

As an example of the effect of the collapsing procedure on actual data, table A-1 shows the in-migrant age distribution.

¹ This score was developed at the Bureau of the Census specifically for this project. An initial formula was developed by Sam Davis, III, and Beverly Causey suggested the final version which weights the calculation by the number of migrants in each age category.

bution for Whites in Arthur County, Nebr., one of the counties for which comparisons with special censuses are shown in table H. The original distribution is quite irregular, with a total of 112 migrants (both sexes), concentrated in 13 of the 30 age cells.

The SRS score for the original distribution is .73. After the first collapse it is .88 for the 6 broad age groups, and since this satisfied the tolerance limits, the migrant data were redistributed at this level. The age distributions after collapsing appear to be more reasonable than the original distribution. They are, however, the result of a statistical manipulation and do not represent actuality.

The impact of the collapsing procedure on the accuracy of the age estimates is not precisely known. For the two smallest counties shown in table H (Arthur and Logan Counties, Nebr.), a simulated procedure using the original migrant age distribution without collapsing was tested. For males, the average error for the simulated age estimates was 32 percent for Logan County and 40 percent for Arthur as compared to 17 and 28 percent, the figures shown in table H for the regular estimates. These results suggest that the collapsing procedure did improve the accuracy of the estimates for small counties, but a much more extensive test will be needed to evaluate the effectiveness of the procedure.

Table A-1. Comparison of Original Immigrant Distribution by Age and Sex With Distribution Smoothed by Collapse Procedure, for the White Population, Arthur County, Nebr.: July 1, 1965 to 1970

(See text for explanation of methodology)

Age in 1970	Immigrants				1970 population (April 1)	
	Male		Female		Male	Female
	Original	Revised	Original	Revised		
5 to 9 years.....	7	7	-	3	28	31
10 to 14 years.....	12	12	6	3	45	38
15 to 19 years.....	8	10	6	11	28	24
20 to 24 years.....	8	6	13	8	16	16
25 to 29 years.....	-	-	-	-	18	15
30 to 34 years.....	-	-	-	-	15	22
35 to 39 years.....	7	6	14	9	16	23
40 to 44 years.....	7	8	-	5	23	12
45 to 49 years.....	10	4	-	1	18	15
50 to 54 years.....	-	5	-	2	19	20
55 to 59 years.....	8	5	6	2	23	15
60 to 64 years.....	-	4	-	1	15	13
65 to 69 years.....	-	-	-	-	10	8
70 to 74 years.....	-	-	-	-	1	6
75 years and over.....	-	-	-	-	14	15

- Represents zero.

Appendix B. List of Counties Adjusted for Military, College, and Institutional Population

(Counties with at least 1 percent of total population and not less than 500 in military barracks or college dormitories, plus selected counties with large institutions. M denotes military, C denotes college, and I denotes institutional)

SELECTED COUNTIES

ALABAMA

Calhoun — M C	Madison — M C
Coffee — M	Montgomery — M
Dale — M	Perry — C
Dallas — M	Pike — C
Elmore — I	Russell — M
Escambia — I	Shelby — C
Lauderdale — C	Sumter — C
Lee — C	Tuscaloosa — C
Macon — C	

ALASKA

Aleutian Islands — M	Kodiak — M
Anchorage — M	S.E. Fairbanks — M
Fairbanks — M C	Yukon-Koyukuk — M

ARIZONA

Cochise — M	Pima — M C
Coconino — C	Yuma — M

ARKANSAS

Clark — C	Lincoln — I
Columbia — C	Mississippi — M
Craighead — C	Pope — C
Drew — C	Pulaski — M
Faulkner — C	Washington — C
Jefferson — C	White — C

CALIFORNIA

Alameda — M	Sacramento — M
Amador — I	San Bernardino — M
Butte — C	San Diego — M
Humboldt — C	San Francisco — M
Kern — M	San Luis Obispo — I
Kings — M	Santa Barbara — M C
Lassen — I	Santa Cruz — C
Marin — I	Solano — M
Merced — M	Tuolumne — I
Monterey — M	Ventura — M
Napa — C	Yolo — C
Orange — M	Yuba — M
Riverside — M	

COLORADO

Adams — M	El Paso — M
Alamosa — C	Gunnison — C
Arapahoe — M	La Plata — C
Boulder — C	Larimer — C
Chaffee — I	Weld — C
Denver — M	

CONNECTICUT

New London — M	Tolland — I
----------------	-------------

DELAWARE

Kent — M C	New Castle — C
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DISTRICT OF COLUMBIA

Washington — M

FLORIDA

Alachua — C	Leon — C
Bay — M	Monroe — M
Bradford — I	Okaloosa — M
Brevard — M	Orange — M
Clay — M	Santa Rosa — M
Duval — M	Sumter — I
Escambia — M	Union — I
Hillsborough — M	Volusia — C
Jackson — I	

GEORGIA

Baldwin — C	Habersham — I
Bleckley — C	Houston — M
Butts — I	Liberty — M
Carroll — C	Lowndes — M C
Chatham — M	Lumpkin — C
Chattahoochee — M	Muscogee — M
Clarke — C	Peach — C
Columbia — M	Richmond — M
Dougherty — M	Sumter — C
Floyd — C	Tattnall — I
Fulton — C	Tift — C
Glynn — M	

HAWAII

Honolulu — M

IDAHO

Bannock — C	Elmore — M
Bonneville — M	Latah — C
Canyon — C	Madison — C

ILLINOIS

Adams — C	Logan — C
Champaign — M C	McDonough — C
Coles — C	McLean — C
De Kalb — C	Morgan — C
Jackson — C	Peoria — C
Jersey — C	Randolph — I
Kankakee — C	St. Clair — M
Knox — C	Warren — C
Lake — M	Will — I
Livingston — I	

INDIANA

Delaware — C	Monroe — C
Grant — C	Montgomery — C
Jasper — C	Porter — C
Jefferson — C	Putnam — C
Johnson — I	St. Joseph — C
Knox — C	Steuben — C
La Porte — I	Tippecanoe — C
Madison — I	Vigo — C
Miami — M	Wabash — C

IOWA

Black Hawk — C	Mahaska — C
Bremer — C	Marion — C
Decatur — C	Plymouth — C
Dubuque — C	Poweshiek — C
Fayette — C	Sioux — C
Jefferson — C	Story — C
Johnson — C	Warren — C
Jones — I	Winneshek — C
Linn — C	Woodbury — C

KANSAS

Atchison — C	Leavenworth — M I
Cowley — C	Lyon — C
Crawford — C	McPherson — C
Douglas — C	Reno — I
Ellis — C	Riley — M C
Franklin — C	Saline — C
Geary — M	Sedgwick — M
Harvey — C	Shawnee — M

KENTUCKY

Calloway — C	Meade — M
Christian — M	Oldham — I
Fayette — C	Rowan — C
Franklin — C	Scott — C
Hardin — M	Union — I
Jessamine — C	Warren — C
Lyon — I	Whitley — C
Madison — C	

LOUISIANA

Bossier — M	Ouachita — C
East Baton Rouge — C	Rapides — M
Lafayette — C	Tangipahoa — C
Lafourche — C	Vernon — M
Lincoln — C	West Feliciana — I
Natchitoches — C	

MAINE

Androscoggin — C	Kennebec — C
Aroostook — M C	Penobscot — C
Cumberland — M C	York — M C
Franklin — C	

MARYLAND

Allegany — C	Kent — C
Anne Arundel — M	Montgomery — M
Carroll — C	Prince Georges — M C
Cecil — M	St. Marys — M
Charles — M	Washington — I
Frederick — C	Wicomico — C
Harford — M	

MASSACHUSETTS

Barnstable — M
 Berkshire — C
 Hampden — M
 Hampshire — C
 Middlesex — C
 Suffolk — C
 Worcester — M C

MICHIGAN

Calhoun — C
 Chippewa — M
 Gratiot — C
 Hillsdale — C
 Houghton — C
 Ingham — C
 Ionia — I
 Iosco — M
 Isabella — C
 Jackson — I
 Kalamazoo — C
 Lenawee — C
 Livingston — I
 Marquette — M C
 Mecosta — C
 Ottawa — C
 Washtenaw — C

MINNESOTA

Beltrami — C
 Blue Earth — C
 Clay — C
 Lyon — C
 Nicollet — C
 Ramsey — C
 Rice — C
 St. Louis — M
 Sherburne — I
 Stearns — C
 Stevens — C
 Winona — C

MISSISSIPPI

Bolivar — C
 Forrest — C
 Harrison — M
 Hinds — C
 Jackson — M
 Lafayette — C
 Lauderdale — M
 Leflore — C
 Lowndes — M C
 Oktibbeha — C
 Sunflower — I
 Tate — C

MISSOURI

Adair — C
 Boone — C
 Callaway — C
 Cape Girardeau — C
 Cass — M
 Cole — I
 Greene — C
 Howard — C
 Johnson — M C
 Lewis — C
 Nodaway — C
 Phelps — C
 Polk — C
 Pulaski — M
 Randolph — I
 Saline — C
 Taney — C

MONTANA

Cascade — M
 Gallatin — C
 Lewis and Clark — C
 Missoula — C
 Yellowstone — C

NEBRASKA

Adams — C
 Buffalo — C
 Dawes — C
 Lancaster — C
 Nemaha — C
 Sarpy — M
 Scotts Bluff — C
 Seward — C
 Washington — C
 Wayne — C

NEVADA

Churchill — M
 Clark — M
 Washoe — C

NEW HAMPSHIRE

Cheshire — C
 Grafton — C
 Merrimack — C
 Rockingham — M
 Strafford — C

NEW JERSEY

Burlington — M
 Cape May — M
 Hunterdon — I
 Mercer — C
 Middlesex — C
 Monmouth — M
 Ocean — M

NEW MEXICO

Bernalillo — M
 Curry — M
 Dona Ana — M C
 Otero — M
 Roosevelt — C
 San Miguel — C
 Santa Fe — C

NEW YORK

Albany — C
 Allegany — C
 Broome — C
 Cattaraugus — C
 Cayuga — I
 Chautauqua — C
 Chemung — I
 Clinton — M I
 Cortland — C
 Delaware — C
 Dutchess — C
 Franklin — C
 Livingston — C
 Madison — C
 Monroe — C
 Oneida — M
 Onondaga — C
 Ontario — C
 Orange — M
 Oswego — C
 Otsego — C
 Rensselaer — C
 St. Lawrence — C
 Saratoga — C
 Schoharie — C
 Sullivan — I
 Tompkins — C
 Ulster — C
 Washington — I
 Wyoming — I
 Yates — C

NORTH CAROLINA

Avery — C
 Carteret — M
 Cleveland — C
 Craven — M
 Cumberland — M
 Durham — C
 Forsyth — C
 Franklin — C
 Guilford — C
 Harnett — M C
 Hertford — C
 Jackson — C
 Onslow — M
 Orange — C
 Pasquotank — C
 Pitt — C
 Rowan — C
 Scotland — C
 Stanly — C
 Union — C
 Wake — C
 Watauga — C
 Wayne — M
 Wilson — C

NORTH DAKOTA

Barnes — C
 Cass — C
 Grand Forks — M C
 Richland — C
 Stark — C
 Ward — M C

OHIO

Ashland — C	Madison — I
Athens — C	Marion — I
Butler — C	Muskingum — C
Clark — C	Portage — C
Defiance — C	Richland — I
Delaware — C	Ross — I
Fairfield — I	Seneca — C
Franklin — C	Warren — I
Green — M C	Washington — C
Hardin — C	Wayne — C
Knox — C	Wood — C
Licking — C	

OKLAHOMA

Canadian — I	Logan — I
Cherokee — C	Okmulgee — C
Cleveland — C	Ottawa — C
Comanche — M	Payne — C
Custer — C	Pittsburg — I
Garfield — M	Pontotoc — C
Greer — I	Pottawatomie — C
Jackson — M	Woods — C
Latimer — C	

OREGON

Benton — C	Lane — C
Clatsop — I	Marion — I
Jackson — C	Polk — C
Klamath — M	Yamhill — C

PENNSYLVANIA

Adams — C	Huntingdon — C
Berks — C	Indiana — C
Butler — C	Lancaster — C
Cambria — C	Lawrence — C
Centre — C	Luzerne — I
Chester — C	Lycoming — C
Clarion — C	Mercer — C
Clinton — C	Monroe — C
Columbia — C	Northampton — C
Crawford — C	Snyder — C
Cumberland — C	Tioga — C
Erie — C	Union — I
Franklin — C	Washington — C
Greene — C	

RHODE ISLAND

Bristol — C	Providence — C
Newport — M	Washington — M C

SOUTH CAROLINA

Abbeville — C	Laurens — C
Bamberg — C	Newberry — C
Beaufort — M	Orangeburg — C
Berkeley — M	Pickens — C
Charleston — M C	Richland — M C
Dorchester — M	Spartanburg — C
Greenville — C	Sumter — M
Horry — M	York — C

SOUTH DAKOTA

Brookings — C	Meade — M
Brown — C	Minnehaha — C
Clay — C	Pennington — M C
Lake — C	Yankton — C
Lawrence — C	

TENNESSEE

Chester — C	Putnam — C
Davidson — C	Rutherford — C
Franklin — C	Shelby — M
Jefferson — C	Tipton — M
Knox — C	Washington — C
Madison — C	Weakley — C
Montgomery — M	

TEXAS

Bee — M	Lubbock — M C
Bell — M	McLennan — C
Bexar — M	Madison — I
Brazoria — I	Nacogdoches — C
Brazos — C	Nueces — M
Brewster — C	Palo Pinto — M
Brown — C	Parker — M
Caldwell — I	Randall — C
Coryell — M	Taylor — M C
Denton — C	Tom Green — M C
Eastland — C	Travis — M C
El Paso — M	Val Verde — M
Erath — C	Walker — C
Grayson — M C	Waller — C
Guadalupe — C	Washington — C
Hays — C	Webb — M
Howard — M	Wichita — M
Hunt — C	Williamson — C
Kleberg — M C	

UTAH

Cache — C	Utah — C
Davis — M I	

VERMONT

Addison — C Washington — C
 Chittenden — C Windham — C
 Rutland — C

VIRGINIA

Albemarle — C	Independent Cities
Amherst — C	Alexandria — M
Arlington — M	Bristol — C
Chesterfield — C	Chesapeake — M
Fairfax — M I	Danville — C
Fauquier — M	Fredericksburg — C
Franklin — C	Hampton — M C
Hanover — C	Harrisonburg — C
Montgomery — C	Lexington — C
Powhatan — I	Lynchburg — C
Prince Edward — C	Newport News — M
Prince George — M	Norfolk — M
Prince William — M	Petersburg — M
Roanoke — C	Portsmouth — M
Rockingham — C	Radford — C
Southampton — I	Richmond — C
Stafford — M	Salem — C
Washington — C	Staunton — C
York — M	Virginia Beach — M
	Williamsburg — C

WASHINGTON

Island — M	Spokane — M C
Kitsap — M	Walla Walla — I
Kittitas — C	Whatcom — C
Mason — I	Whitman — C
Pierce — M	

WEST VIRGINIA

Barbour — C	Mercer — C
Cabell — C	Monongalia — C
Fayette — C	Ohio — C
Gilmer — C	Randolph — C
Jefferson — C	Upshur — C
Marion — C	

WISCONSIN

Brown — I	Grant — C
Dane — C	Jefferson — C
Dodge — I	La Crosse — C
Douglas — C	Pierce — C
Dunn — C	Portage — C
Eau Claire — C	Walworth — C
Fond du Lac — C	Winnebago — C

WYOMING

Albany — C	Laramie — M
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Appendix C. Major Adjustments to the 1965-70 Migrant Data

In three local situations, substantial adjustments were made to the 1965-70 data as tabulated and presented in Current Population Reports, Series P-25, No. 701. In Chambers County, Ala., the allocation procedure which assigned place of origin to migrants for whom origin was not provided by the census data resulted in a very large number of White male outmigrants in the age groups 15 to 19 and 20 to 24. This occurred as a result of a problem involving military personnel enumerated in barracks in 1970. For purposes of this age estimate project, the outmigrants for Chambers County for these two cells were decreased by the amount of the allocation. This change produced a more reasonable age-sex-race distribution for the final population estimate.

Another major change involved Baltimore City and County, Md. In this case, an unreasonable number of Black-and-other-races outmigrants were reported for Baltimore County in the original census data. This was the result of incorrect or ambiguous responses of outmigrants from Baltimore City resulting in their being coded as outmigrants from the County. There did not seem to be a serious problem with the age distribution of migrants, but the incorrect heavy net outmigration indicated for Baltimore County had a serious impact on the subsequent adjustment of migrants for all counties in Maryland in the program

which produced consistency with the independent postcensal estimate of total population. To prevent this, outmigrants were decreased for the county so as to obtain zero net migration, all ages, while retaining the proportions, by age, of the original data. The amount of change, age by age, was added to Black-and-other-races outmigrants for Baltimore City.

The third adjustment did not involve any change in the numbers as reported, but a sizable assignment of place of residence for outmigrants from New York City was required. Persons residing outside of New York City in 1970 who reported in the census that they had lived in New York City in 1965 received a special code which did not specify borough of former residence. It was possible to calculate the number for each borough by sex and race, but not by age. These will be called Type 1 outmigrants. Persons living in New York City in 1970 who said they had lived in another borough in 1965, but did not identify it, also received this special code, and it was possible to reconstruct data for these persons by sex and race for broad age groups. These are Type 2 outmigrants. Detailed age groups were estimated for Type 2 outmigrants; and Type 1 outmigrants were assigned these age distributions, specific by sex and race. The sum of Type 1 and Type 2 outmigrants was added to the original census data, which did not include movers with the special code.

Appendix D. Definitions of Technical Terms

[All definitions relate to the period 1965 to 1970]

Military outmigrants. Outmigrants who were in the Armed Forces in 1965, and in any category in 1970.¹

Military immigrants. Immigrants who were in the Armed Forces in 1970 and in any category in 1965.¹

College outmigrants. Outmigrants (excluding those in the Armed Forces in 1965) who were attending college in 1965 and in any category in 1970.²

¹ For 184 counties with a resident military population of at least 100 in 1970. (Counties listed in appendix B.)

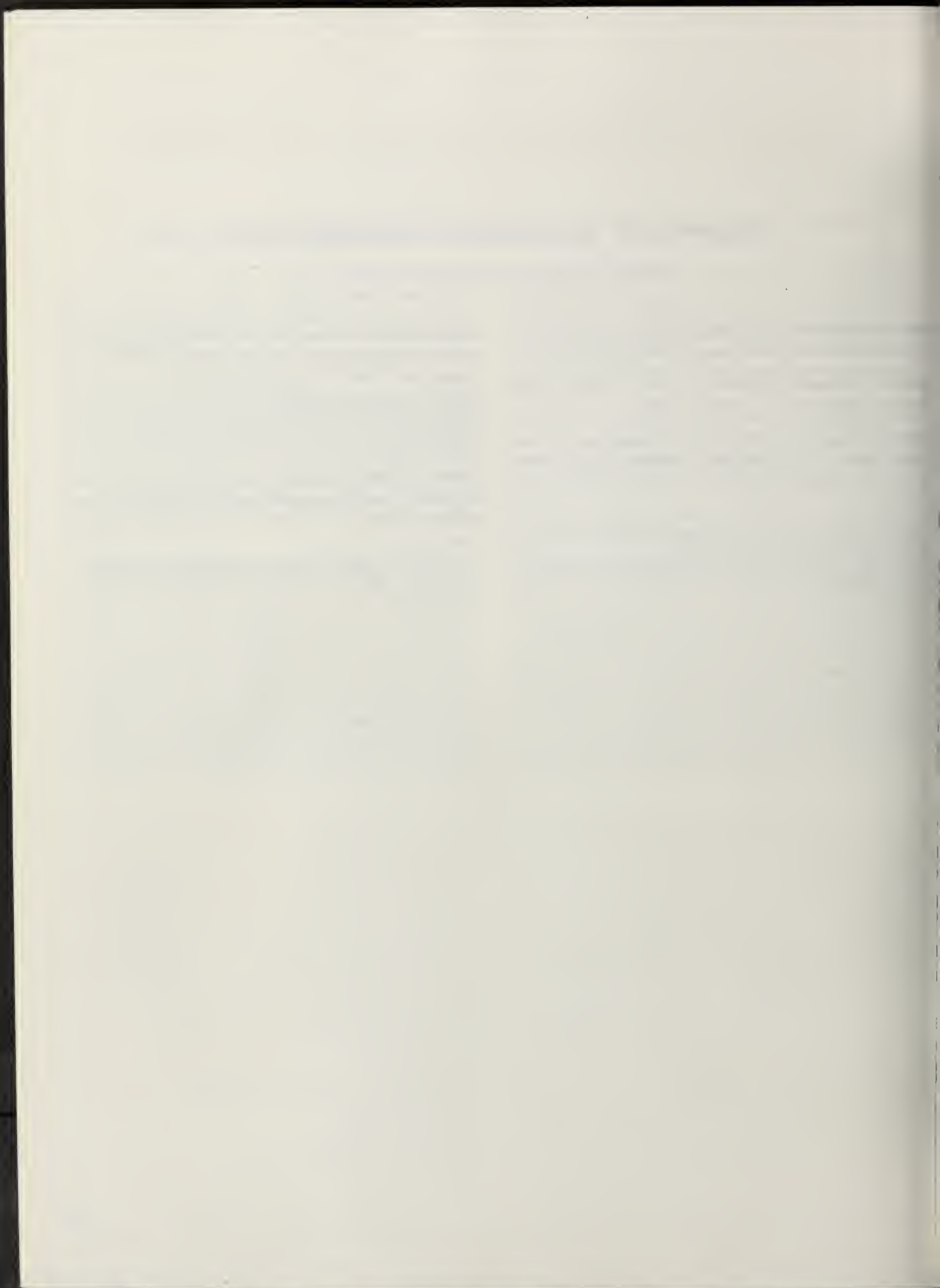
² For 427 counties with relatively large colleges or universities having a dormitory population of at least 500 in 1970. (Counties listed in appendix B.)

College immigrants. Immigrants (excluding those in the Armed Forces in 1970) who were attending college in 1970 and in any category in 1965.²

Civilian noncollege outmigrants. Outmigrants who were not in the Armed Forces or attending college in 1965, and in any category in 1970.³

Civilian noncollege immigrants. Immigrants who were not in the Armed Forces or attending college in 1970, and in any category in 1965.³

³ Also excludes estimated migration for correctional institutions in 70 counties, as described in section on methodology. (Counties listed in appendix B.)



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NAME _____

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STATE _____

ZIP _____

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When in the Course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth, the separate and equal station to which the laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We the Representatives of the United States of America, in General Congress assembled, do hereby declare that these United States are, and of right ought to be, free and independent States; that they are absolved from all allegiance to the British Crown, and that all political connections between them and Great Britain are hereby totally dissolved.

That the United States have, and of right ought to have, full power to levy war, conclude peace, contract alliances, establish commerce, and to do all other acts and things which independent States may do.

That the Declaration of Independence of the United States is hereby acknowledged, and that the same is hereby declared to be the basis of the Constitution of the United States, and that the same is hereby declared to be the basis of the laws of the United States, and that the same is hereby declared to be the basis of the rights and liberties of the people of the United States.

That the United States have, and of right ought to have, full power to levy war, conclude peace, contract alliances, establish commerce, and to do all other acts and things which independent States may do.

That the Declaration of Independence of the United States is hereby acknowledged, and that the same is hereby declared to be the basis of the Constitution of the United States, and that the same is hereby declared to be the basis of the laws of the United States, and that the same is hereby declared to be the basis of the rights and liberties of the people of the United States.

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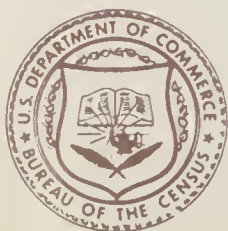
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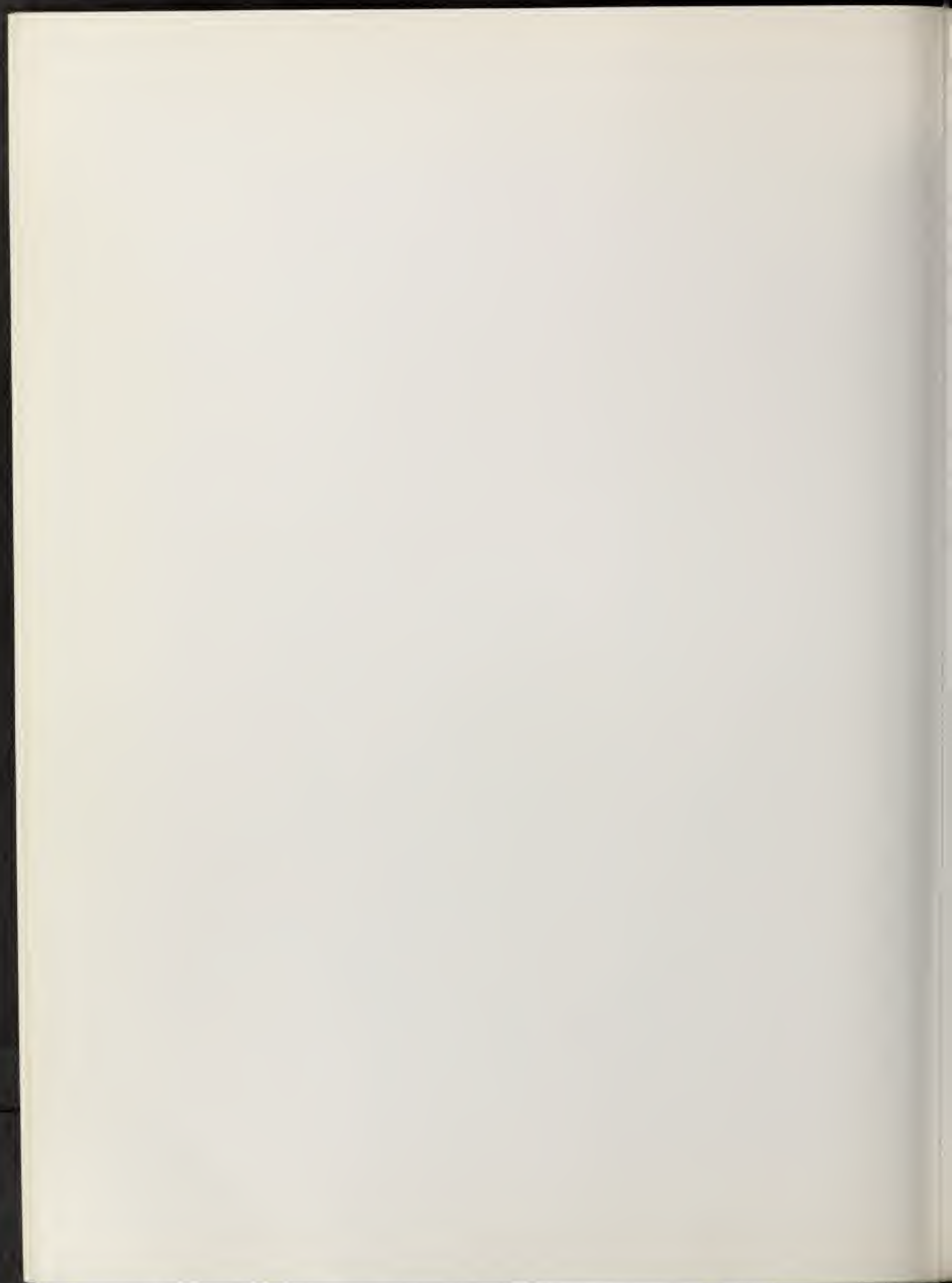


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American Families and Living Arrangements





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American Families and Living Arrangements



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United States. Bureau of the Census.
American families and living arrangements.

(Current Population reports: Special studies:
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Originally prepared for the 1980 White House Conference on Families.

1. Family—United States—Statistics. I. Title.

II. Series: United States. Bureau of the Census.

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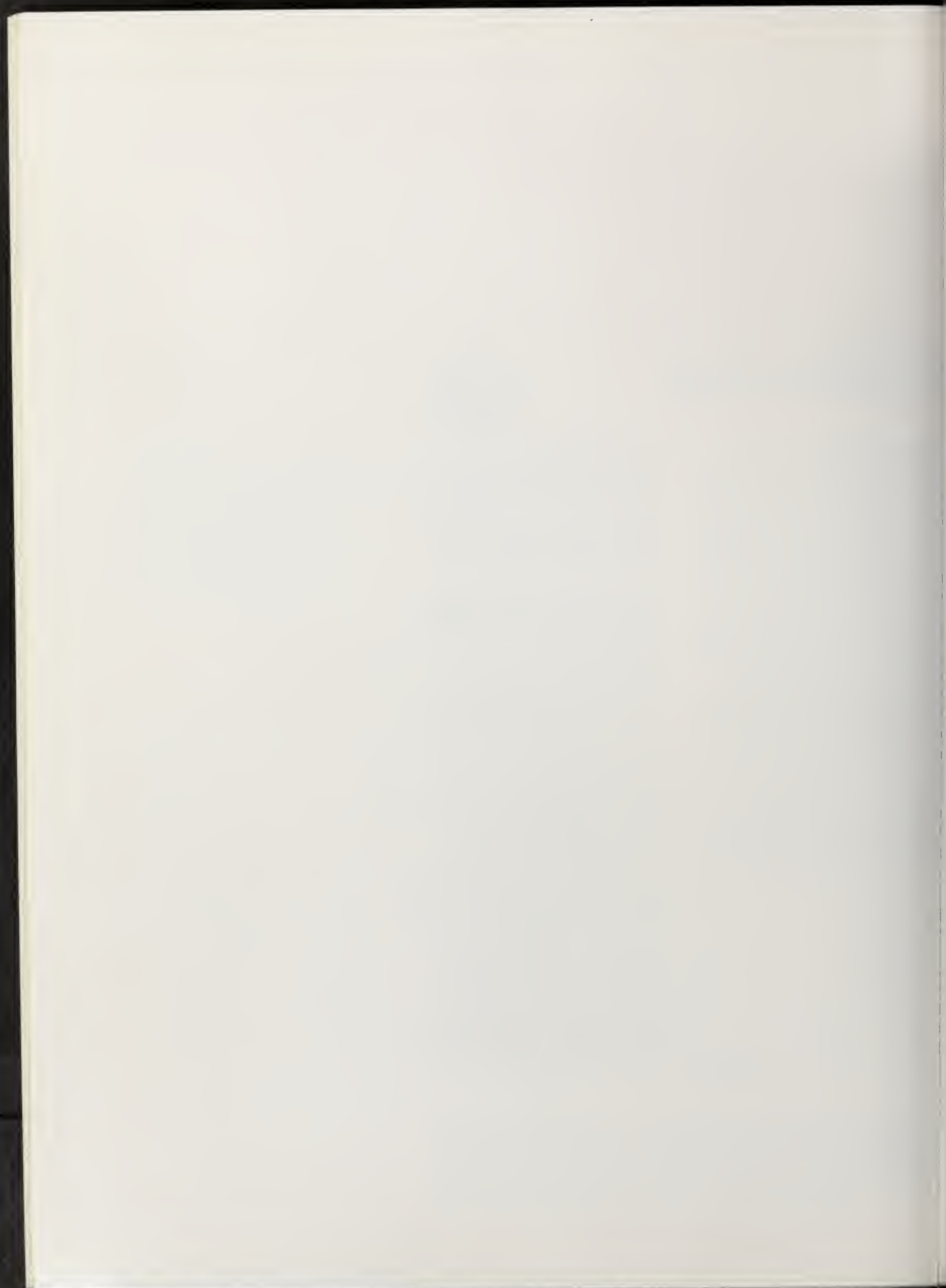
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Introduction

The past quarter century has produced a remarkable amount of change in nearly every sphere of American life. Recent trends seem to have had an extraordinary impact on the attitudes and values which provide the foundation for social cohesion in the United States. As these cultural patterns undergo revision, social institutions also experience some reshaping. In this process, the family has not been exempt. These developments have altered the way that many households and families are formed, maintained, and dissolved. The charts in the following pages are presented as an illustration of how patterns of change may be perceived through the use of survey and census statistics.

This chartbook was originally prepared by the Bureau of the Census, U.S. Department of Commerce, for the use of delegates and other participants in the 1980 White House Conference on Families. It provides a graphic overview of selected recent family trends reflecting changes in the personal lifestyles of many Americans. Information and limited commentary are presented on family formation, family dissolution, and living arrangements of the U.S. population. The charts document: attitudes toward family life; trends in fertility; levels of first marriage, divorce, and remarriage; changes in living arrangements of adults and children and in family and household makeup; developments in the economic aspects of family life including increases in the number of working wives and working mothers, income of families of various types, and trends in homeownership; and a description of families according to residence inside or outside of metropolitan areas.

This report is intended to be only generally descriptive of changes in family living. Much more detailed information on most of the topics presented in the charts and associated areas of interest are available in other Current Population Reports.



Most Americans place a high value on family life.

Three of every four adults since 1973 say they find "a very great deal" or "a great deal" of satisfaction with family life.

One-half of U.S. adults oppose older persons sharing homes with grown children.

The growing tendency for older persons and their grown children to live apart reflects the finding that one-half of adults think that two generations of adults living together is "a bad idea." A "generation gap" may be involved among many who say it is only "a good idea" or "depends."

Almost all married people say they have a happy marriage.

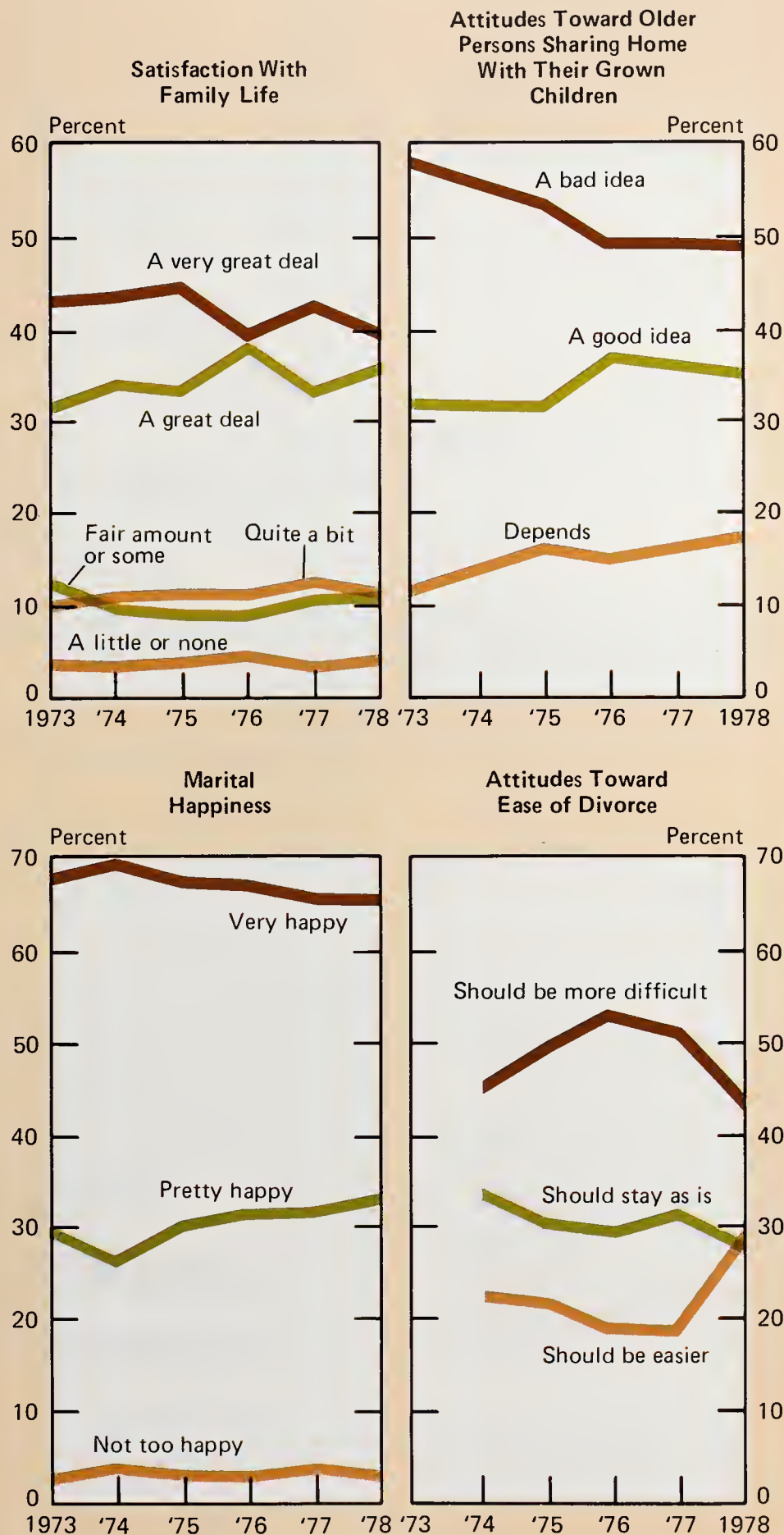
Although two-thirds of married adults report being "very happy," most of the other one-third say they are only "pretty happy" in their marriage. Many of those who were unhappily married apparently have divorced.

Nearly one-half of U.S. adults believe divorce should be more difficult.

As divorces have become increasingly easy to obtain, a declining proportion of adults say that the ease of obtaining a divorce should stay as it is. Variable proportions say it should be more difficult or less difficult to obtain a divorce.

Chart 1.

Public Perceptions -- Satisfaction With Family Life, Attitudes Toward Older Persons Sharing Home With Their Grown Children, Marital Happiness, and Attitudes Toward Ease of Divorce: 1973-78

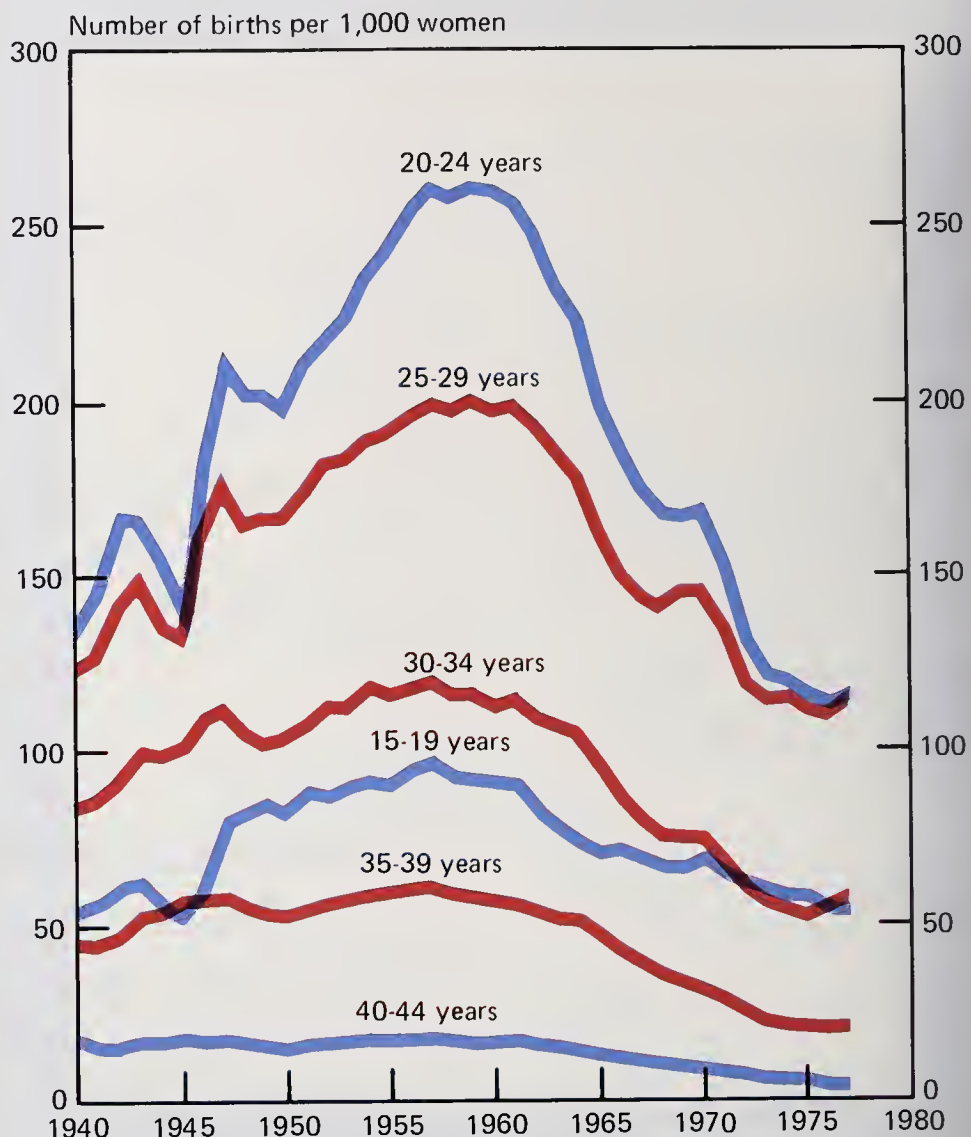


Source: National Opinion Research Center, University of Chicago.

Late childbearing has risen very little.

After several years of increasing postponement of marriage and childbearing, there is still no increase in the rate of marriage for women in their late twenties and only a very small upturn in the birth rate for women in their early thirties.

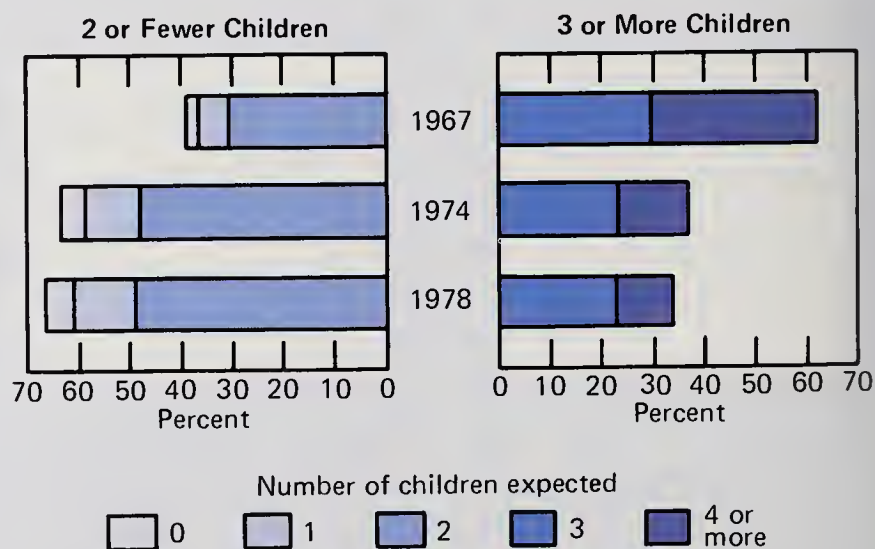
Chart 2.
Fertility Rates, by Age of Mother: 1940-77



Fewer women are expecting to have three or more children.

The proportion of wives 18 to 34 in 1978 who expected to have three or more children was less than one-half as large as a decade earlier. Six percent now expect to have no children. One in six wives expect to remain childless or to have only one child.

Chart 3.
Lifetime Births Expected by Wives 18 to 34 Years Old, for Selected Years: 1967-78



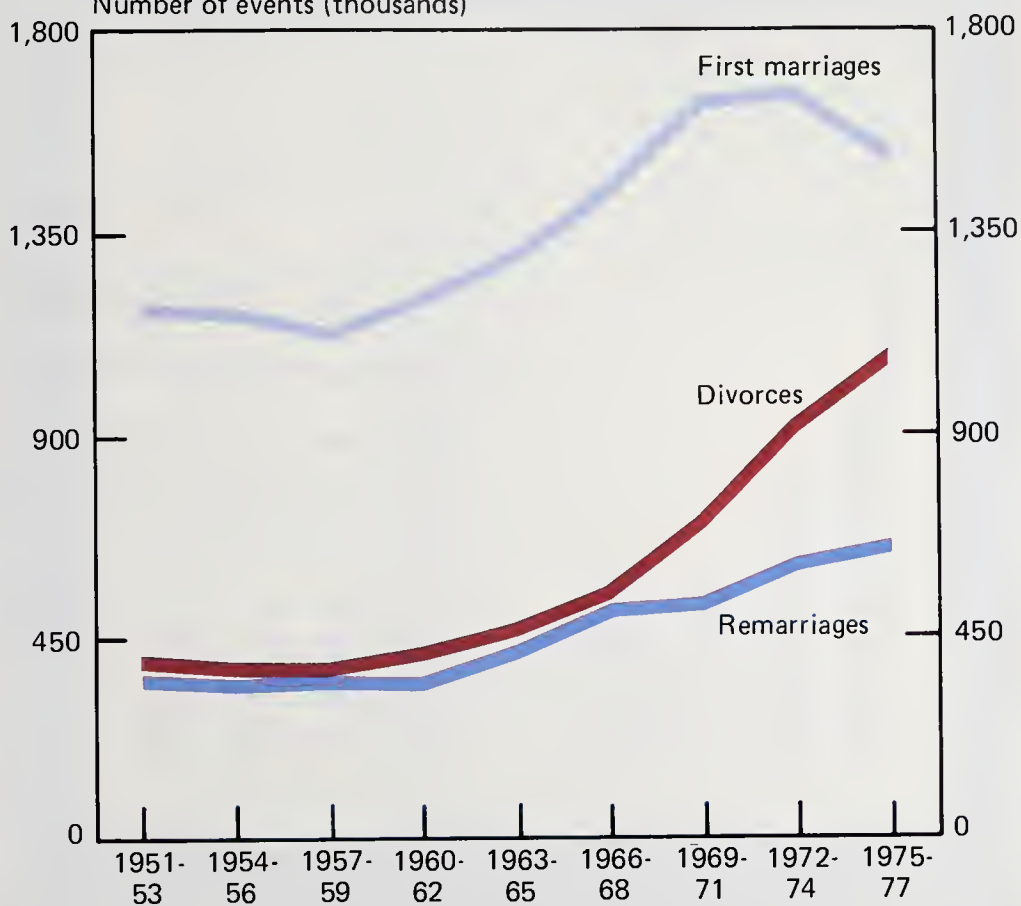
First marriage and remarriage decline as divorce rises.

The number of first marriages rose during the 1960's as persons born during the baby boom reached the average marrying age, but the marriage rate per 1,000 never-married persons continued a longtime downward trend. Divorces surged upward during the 1960's and early 1970's but now the increase has slowed.

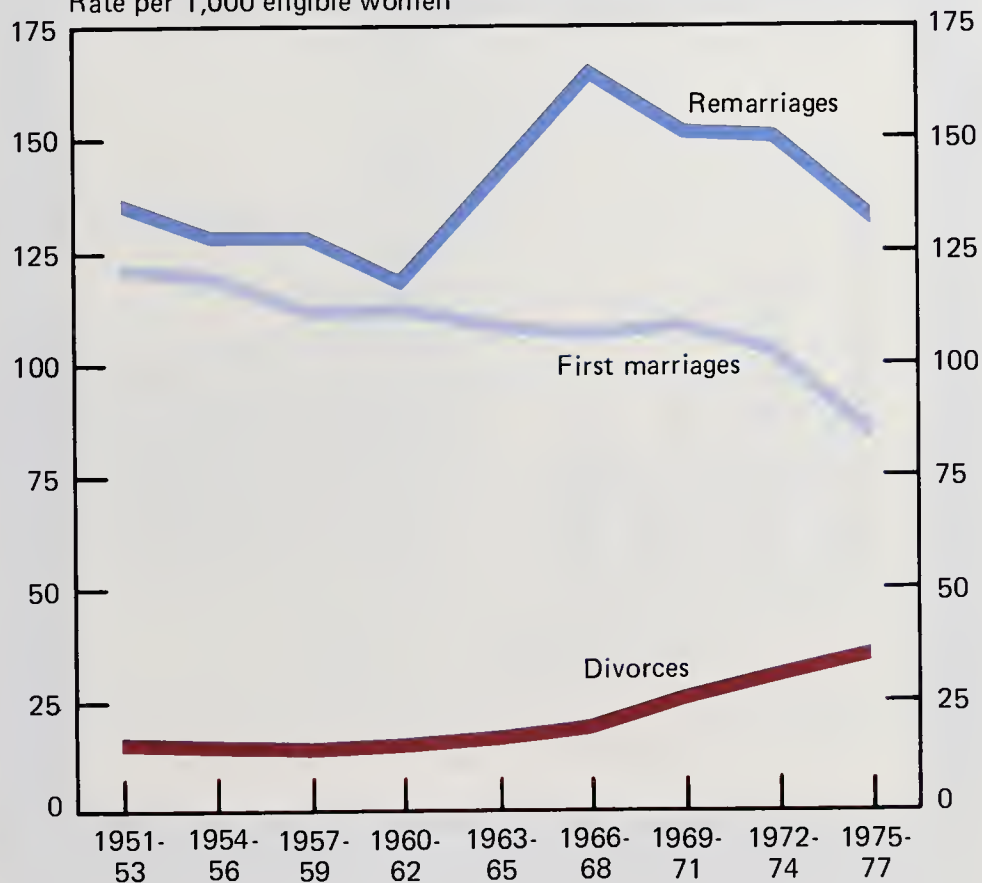
Chart 4.

Number and Rate of First Marriages, Divorces, and Remarriages of Women: 1951-77

Number of events (thousands)



Rate per 1,000 eligible women



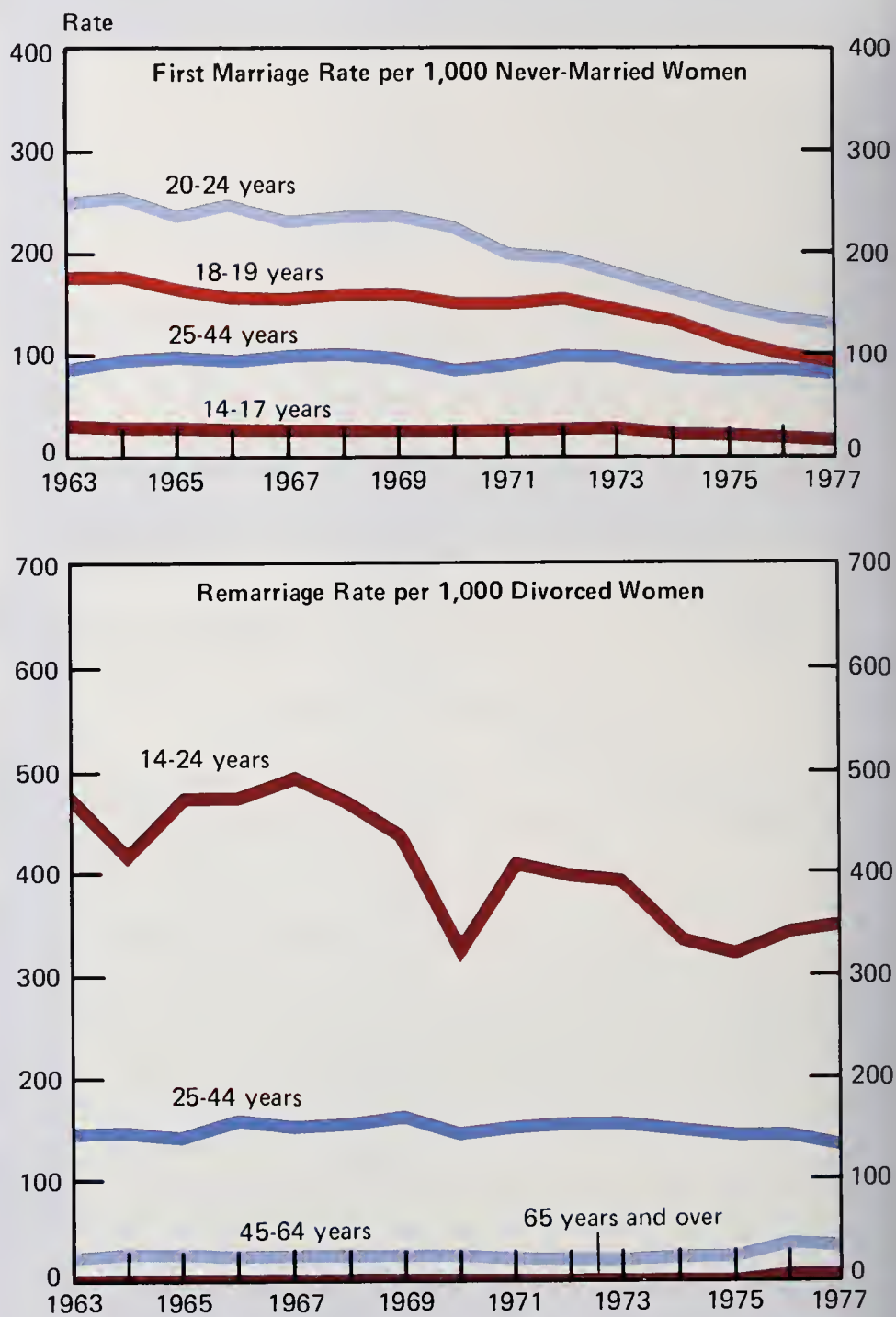
Source: U.S. Bureau of the Census.

Decline in marriage is greatest in late teens and early twenties.

As more young adults continue their education at the college level and as more of them work and establish separate households, more first marriages and also more remarriages after divorce are being postponed at least temporarily.

Chart 5.

First Marriage and Remarriage Rates Among Women, by Age: 1963-77



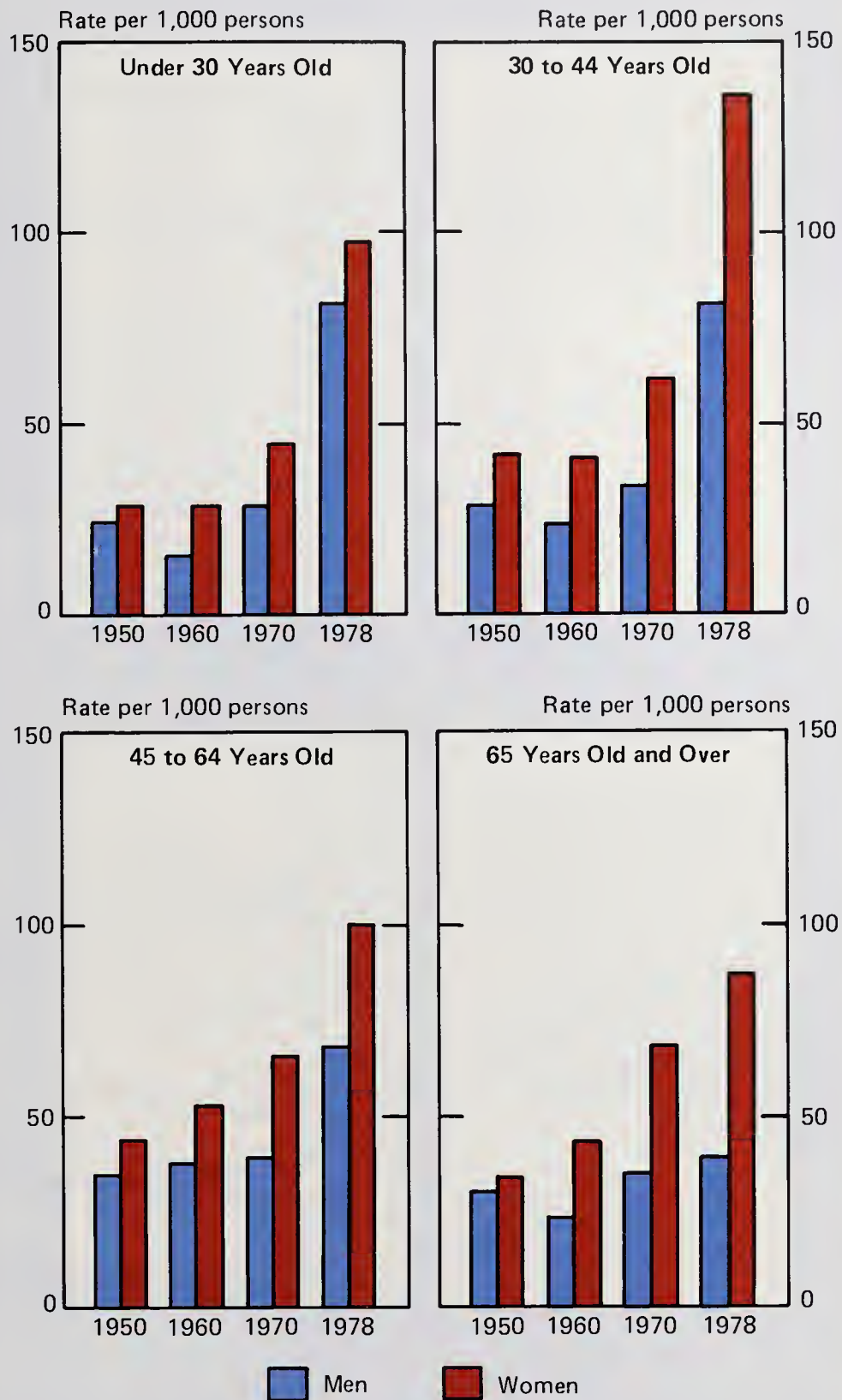
Source: U.S. National Center for Health Statistics.

The ratio of divorced persons to married persons has increased at each age level.

The "divorce ratio" has increased most rapidly at ages under 45. Above age 30, the divorce ratio for women has risen more rapidly than that for men, as divorced men continue to have higher remarriage rates than divorced women.

Chart 6.

Divorced Persons Per 1,000 Married Persons With Spouse Present, by Sex and Age, for Selected Years: 1950-78



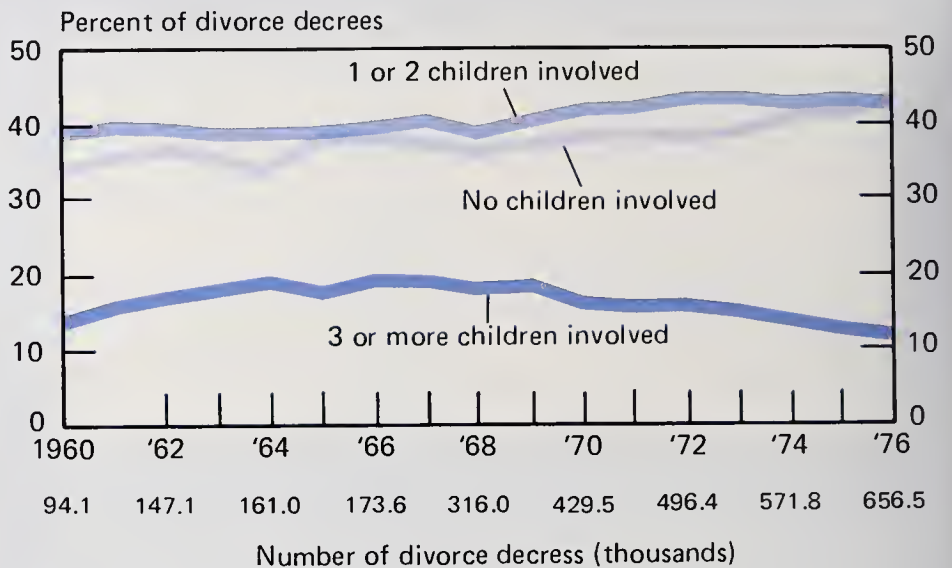
Source: U.S. Bureau of the Census.

More divorces now involve no children or only one or two children.

As the birth rate has fallen, a declining proportion of divorces has involved three or more children, especially after the mid-1960's. Adults who become divorced find it easier to cope after their marriage is dissolved if few or no children are involved.

Chart 7.

Divorce Decrees Involving Children, by Number of Children: 1960-76



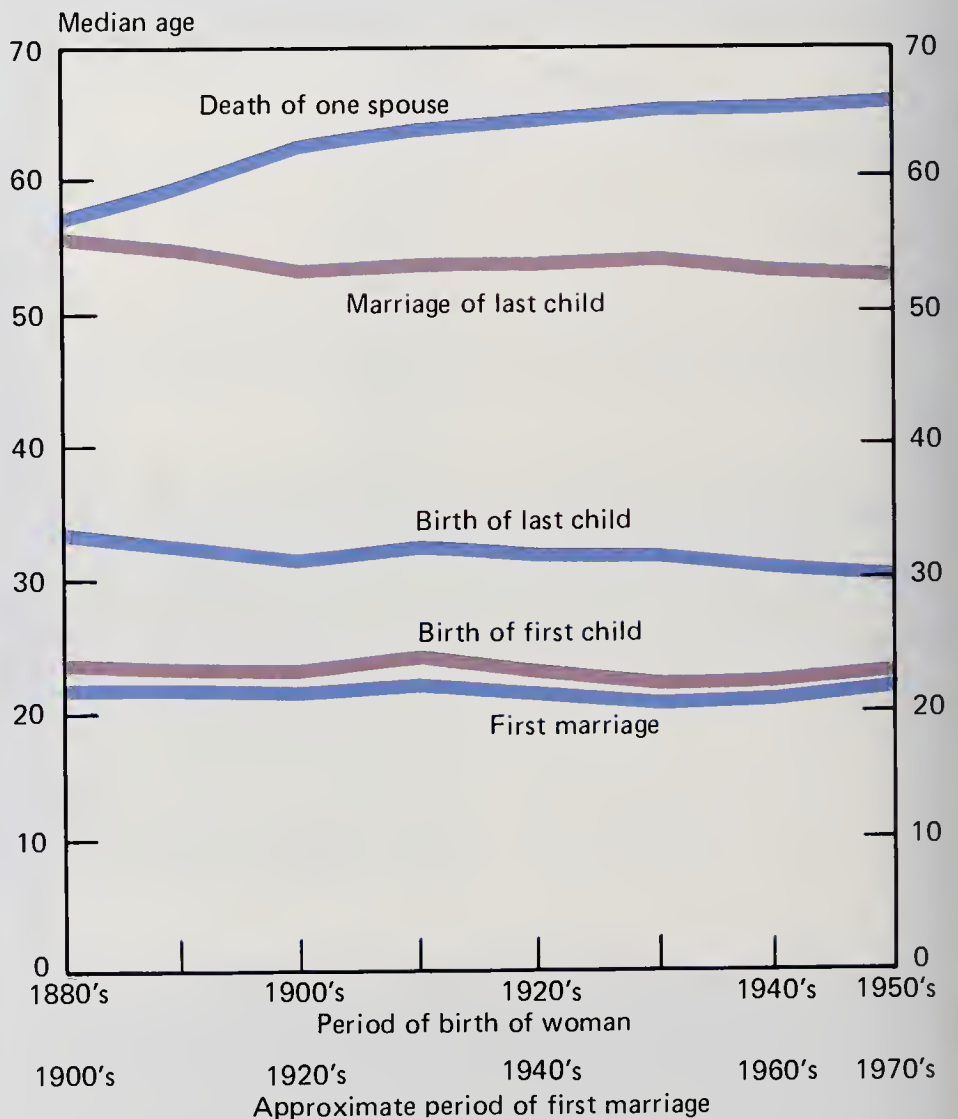
Source: U.S. National Center for Health Statistics.

Less married life is being spent in childrearing and more after the children leave home.

Ending childrearing earlier and increasing chances of living past middle age have added greatly to the length of time couples live together with no children in the home. More women in their forties and fifties now work outside the home for personal satisfaction and to maintain or raise living standards. Income per family member is highest during this period.

Chart 8.

Median Age of Mothers at the Beginning of Selected Stages of the Family Life Cycle: 1900-1970

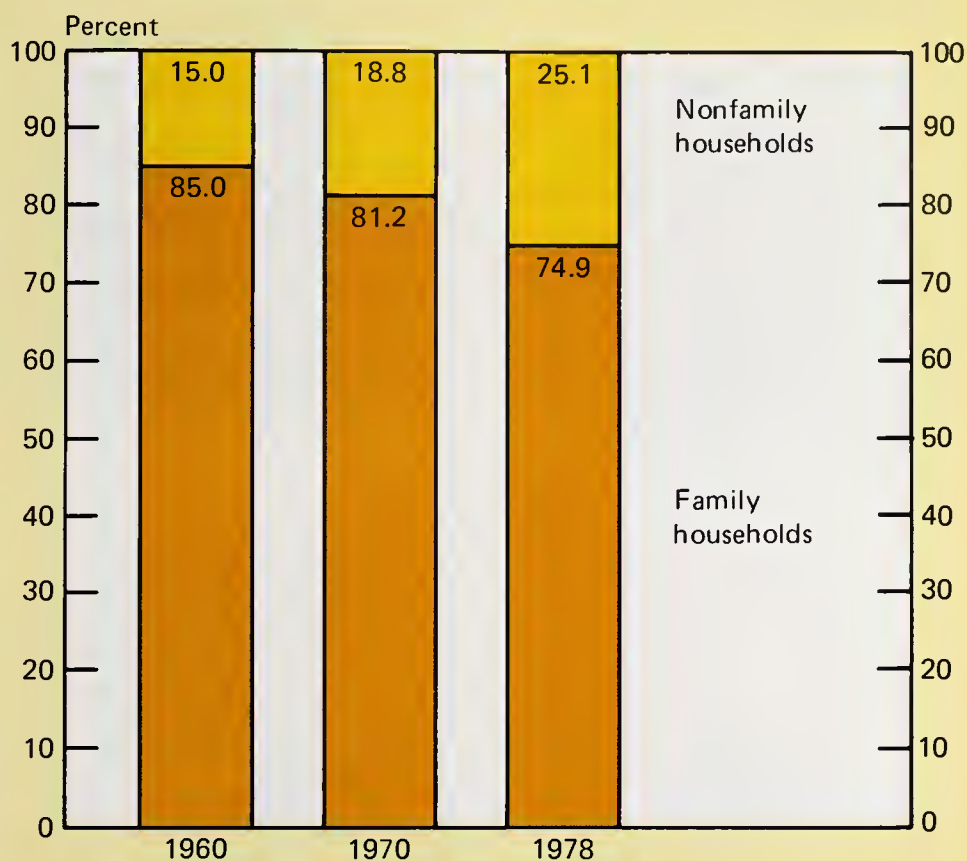


Source: U.S. Bureau of the Census.

One-fourth of all households include no family group.

As more elderly wives outlive their husbands and as more young adults establish separate homes before marriage or after separation or divorce, a growing number of adults live apart from relatives, usually alone.

Chart 9.
Family and Nonfamily Households as a Percent of All Households: 1960, 1970, and 1978

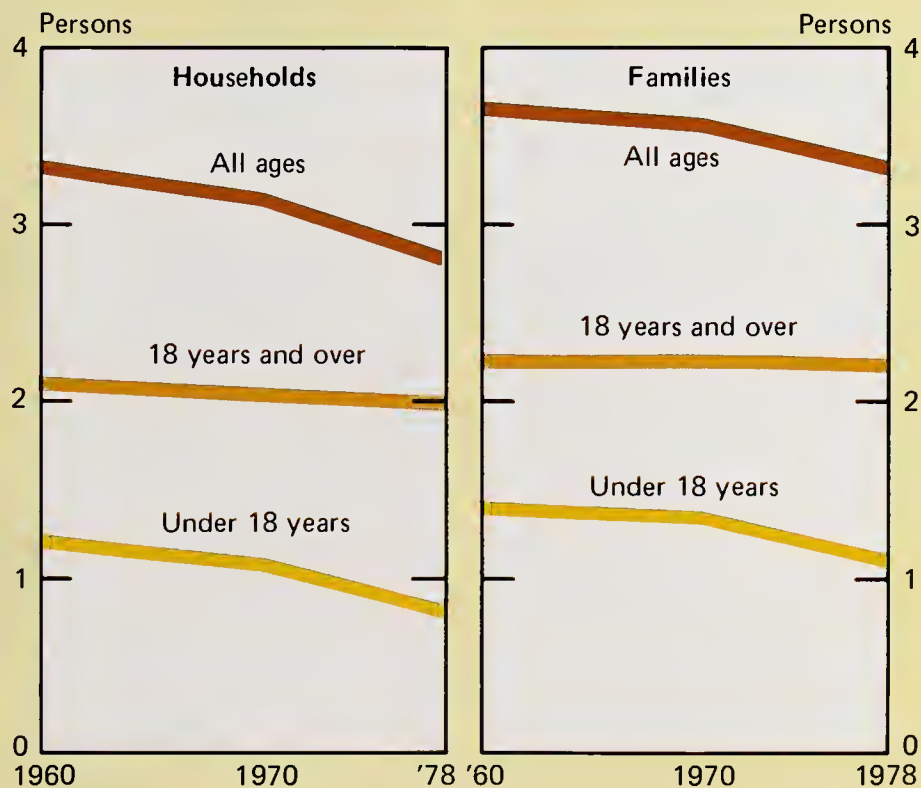


Source: U.S. Bureau of the Census.

Declining birth rates cause household and family sizes to shrink.

Households and families are becoming smaller mainly because the number of young children in the home is diminishing. Increases in the number of persons living alone have caused household size to decline more rapidly than family size.

Chart 10.
Average Size of Households and Families: 1960, 1970, and 1978



Source: U.S. Bureau of the Census.

Families with working wives and those maintained by women have increased rapidly.

Since the 1950's, a steadily growing proportion of families has included a couple with the wife in the paid labor force. Since 1970, a rapidly growing proportion of families has been maintained by women who are divorced, separated, or never married and who generally have one or more children for whom they have custody.

One-half of married-couple families have no young children in the home.

Postponement of childbearing and especially the lengthening period of married life after the children leave home account primarily for so many couples with no sons or daughters under 18 living with them at one point in time. Men rarely have custody of children under 6, but one-fourth of the mothers who have sole custody of the children have one or more preschoolers to care for.

Chart 11.
Families, by Type, for Selected Years: 1955-78

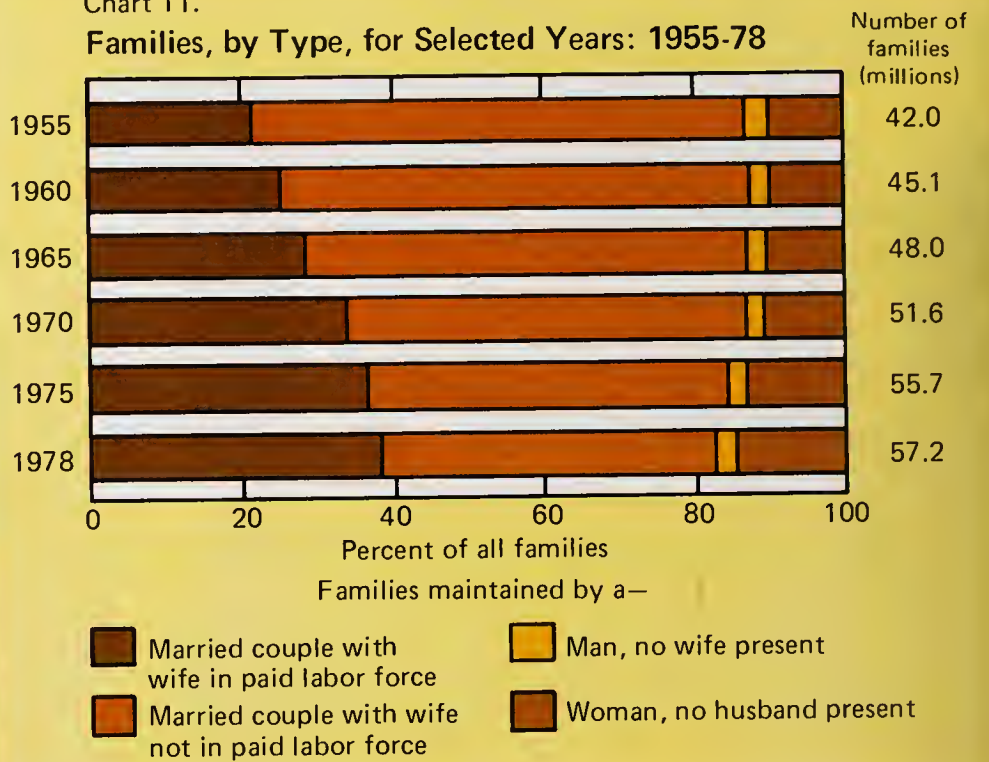
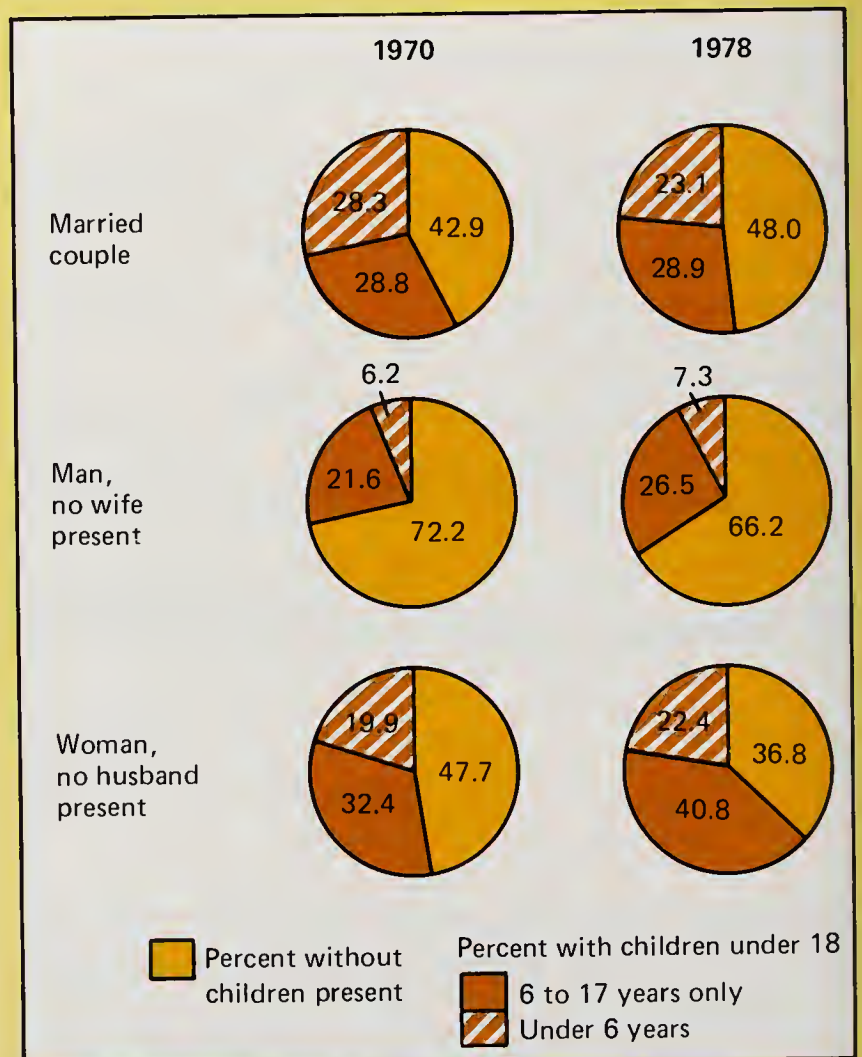


Chart 12.
Types of Families, by Presence of Children Under 18 and 6 Years: 1970 and 1978

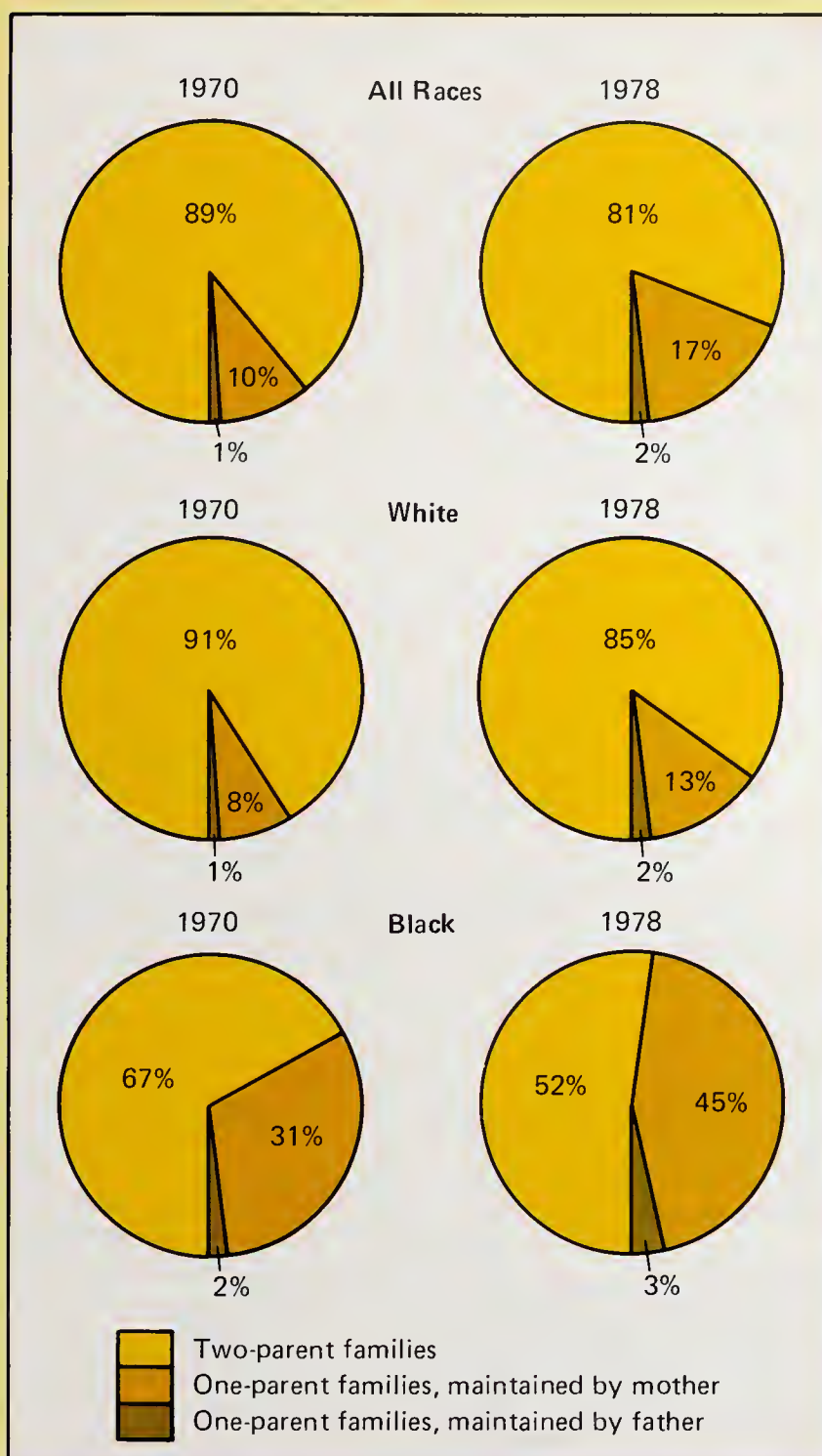


Almost one-half of Black mothers have no husband sharing their home.

Three times the proportion of Black mothers as White mothers have no husband in the home to help with the nurturing of children. For both groups, the proportion of such mothers was 1½ times as large in 1978 as in 1970.

Chart 13.

One-Parent Families as a Proportion of All Families With Children Present: 1970 and 1978



Source: U.S. Bureau of the Census.

Despite recent changes, three of every four persons in the United States live in married-couple households.

This proportion declined from 85 percent in 1960 to 75 percent in 1978. Fifty percent of the 220 million people lived in married-couple households with young children present, and nine percent lived in one-parent households. Among the others, 2.7 million persons in 1978 lived in households of unmarried couple of opposite sex, twice as many as in 1970.

Chart 14.
Living Arrangements of the Noninstitutional Population: 1960, 1970, and 1978

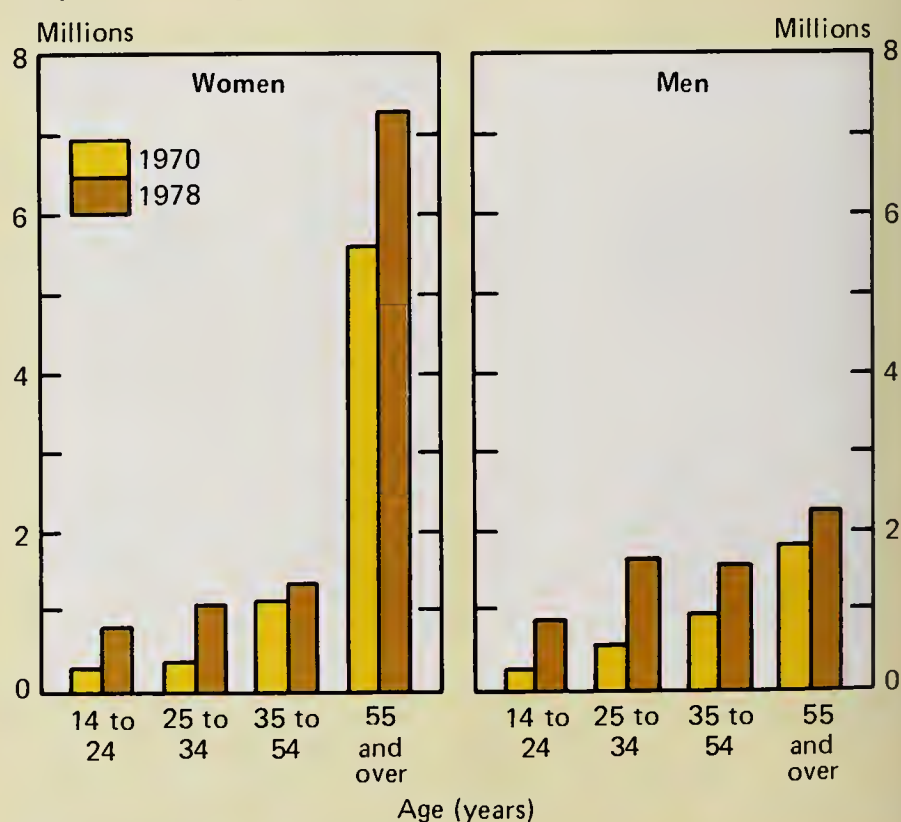


Source: U.S. Bureau of the Census.

Older women are the largest age-sex group of persons living alone, but the rate of increase has been fastest among young adults.

Two of every five persons living alone are women 55 years old or over, but the number of men and women under 35 living alone increased fastest (tripled) between 1970 and 1978, as 3 million more young adults maintained one-person households while separated, divorced, or not yet married.

Chart 15.
Persons 14 Years Old and Over Living Alone, by Sex and Age: 1970 and 1978

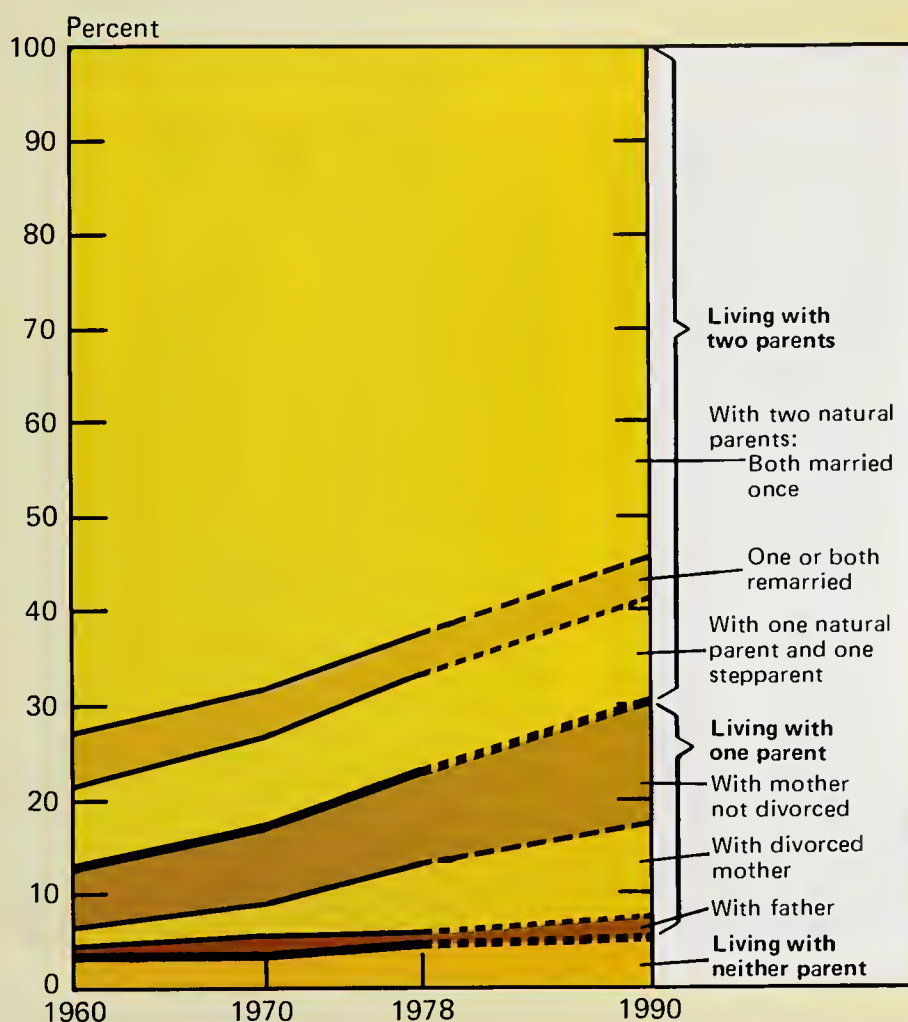


Source: U.S. Bureau of the Census.

ninety-six percent of all children under 18 live with one or both parents.

However, the proportion living with one parent doubled from 1960 to 1978, while those living with two parents declined from 83 percent to 78 percent. One of every eight children living with two parents lives with a natural parent and a stepparent. Two of every three living with one parent live with a divorced or separated parent.

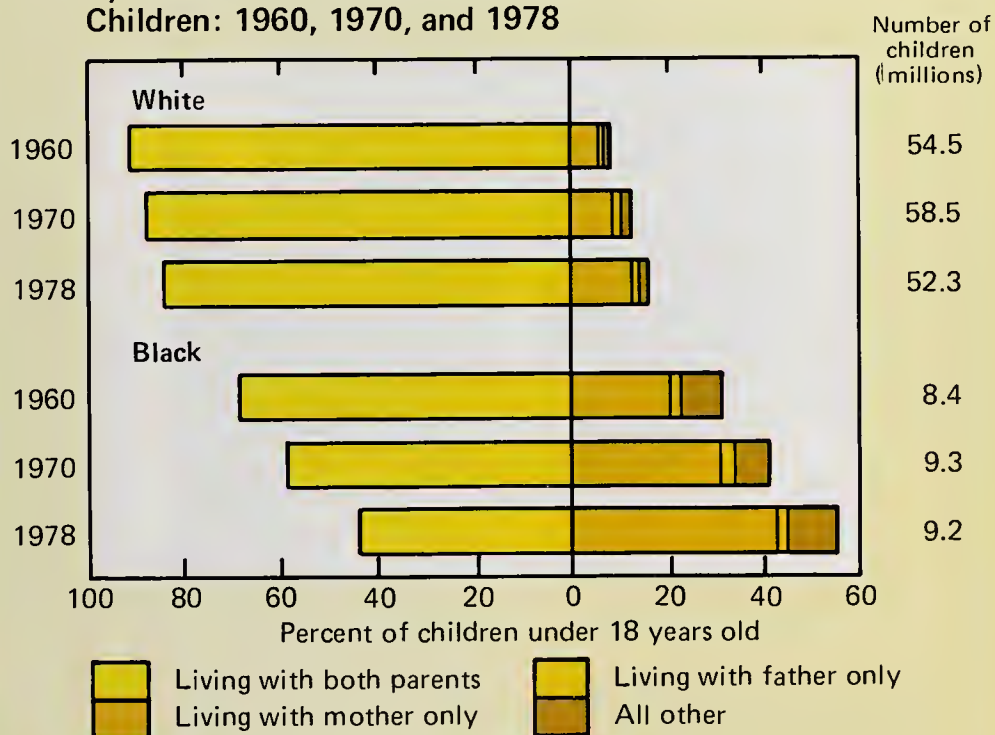
Chart 16.
Living Arrangements of Children Under 18 Years Old: 1960-90



About the same number of Black children live with one parent as live with two parents.

In 1978, 45 percent of Black children under 18 lived with one parent and 44 percent lived with two parents; corresponding figures for White children were 14 percent and 84 percent, respectively. For both groups, the proportion living with one parent doubled from 1960 to 1978. One of every ten children living with one parent lived with the father.

Chart 17.
Children Under 18 Years Old in Families, by Presence of Parents and Race of Children: 1960, 1970, and 1978



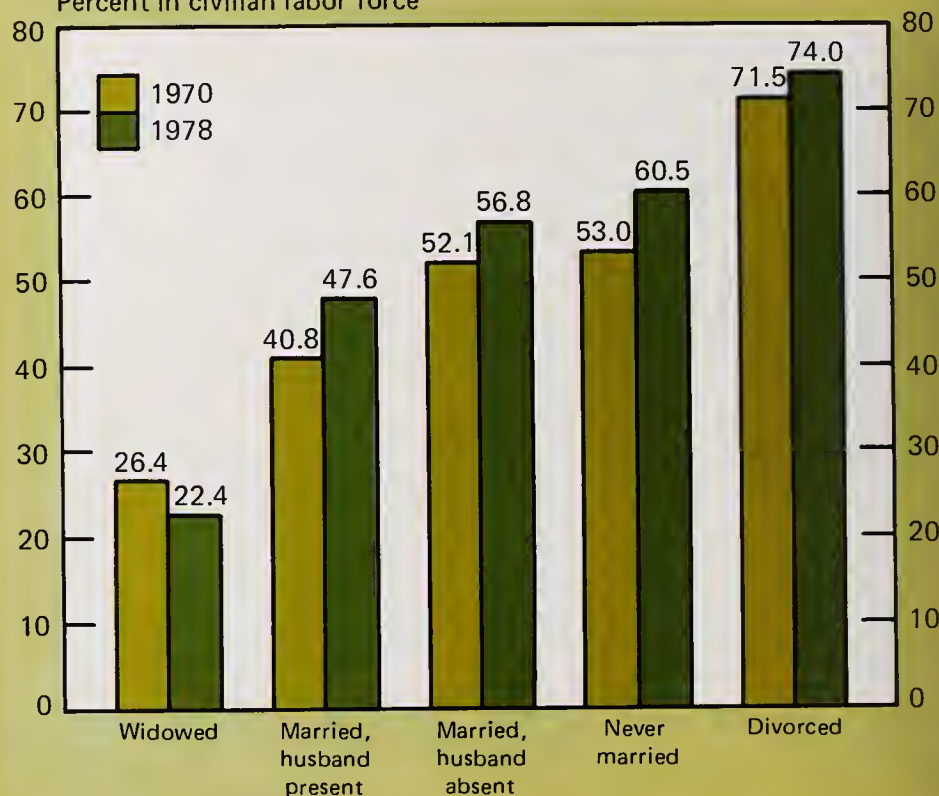
Labor force participation rates among women continue to be highest among the divorced.

Three of every four divorced women are in the labor force, compared with one of every two married women. Since almost nine-tenths of widows are 65 years old or older, only one-fifth of the 10.1 million widows are in the labor force. Rates of employment increased most in the 1970's for married women and never-married women.

Chart 18.

Labor Force Participation Rates of Women, by Marital Status: 1970 and 1978

Percent in civilian labor force



Source: U.S. Bureau of Labor Statistics.

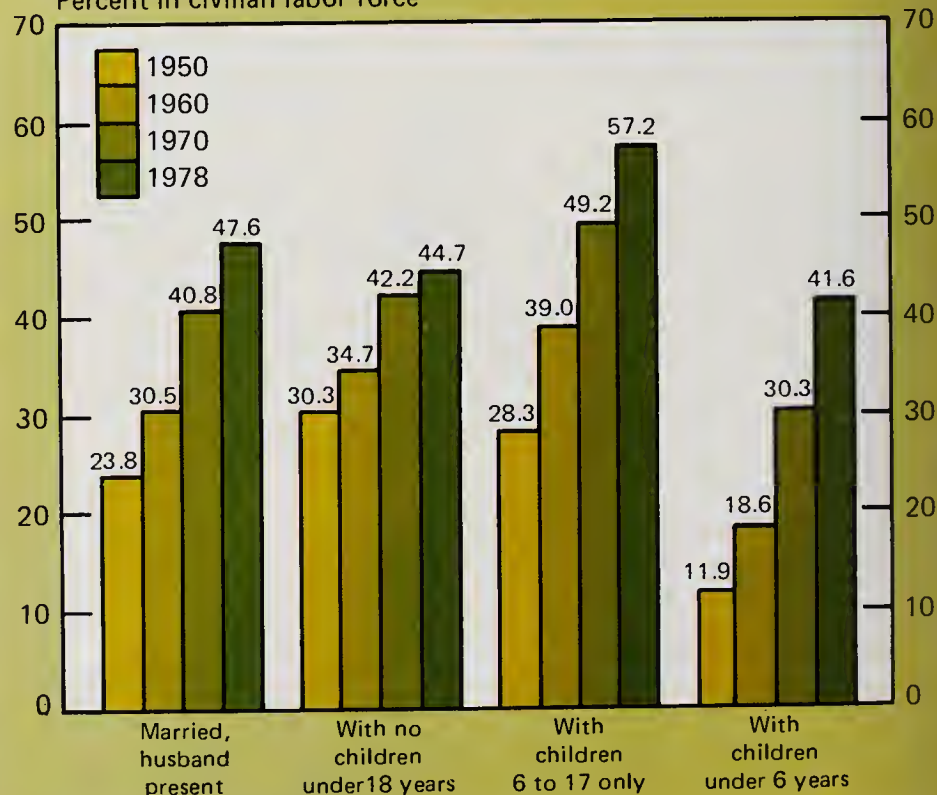
Labor force participation rates have increased most rapidly for married women with children of preschool age.

Between 1950 and 1978, the labor force participation rate more than tripled for married mothers of preschoolers, doubled for those with school-age children only, and increased by one-half for those with no young children. Most of the increase since 1950 occurred from 1960 to 1978 as the birth rate declined and the level of education of women increased sharply.

Chart 19.

Labor Force Participation Rates of Married Women With Husband Present, by Presence and Age of Children: 1950-78

Percent in civilian labor force



Source: U.S. Bureau of the Census, and U.S. Bureau of Labor Statistics.

one-half of the lone mothers of preschoolers are in the labor force.

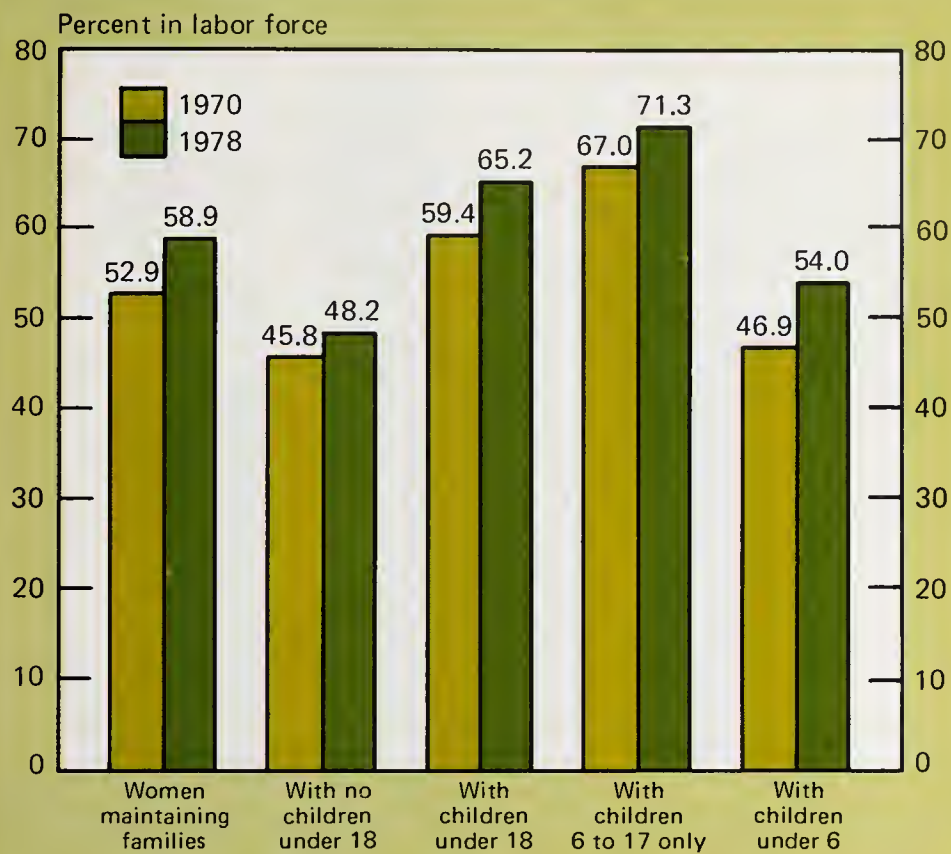
the pattern of worker rates by presence and age of children for women maintaining families with no husband in the home is, as expected, uniformly higher than that for married women living with their husbands.

almost nine-tenths of children 3 to 13 years old are provided day care in their own homes.

most children are provided day-care by their own parents if their mother is not in the labor force, while three-fifths of those with their mother in the labor force receive daytime care from their parents. Most of the children of working mothers are of school age.

Chart 20.

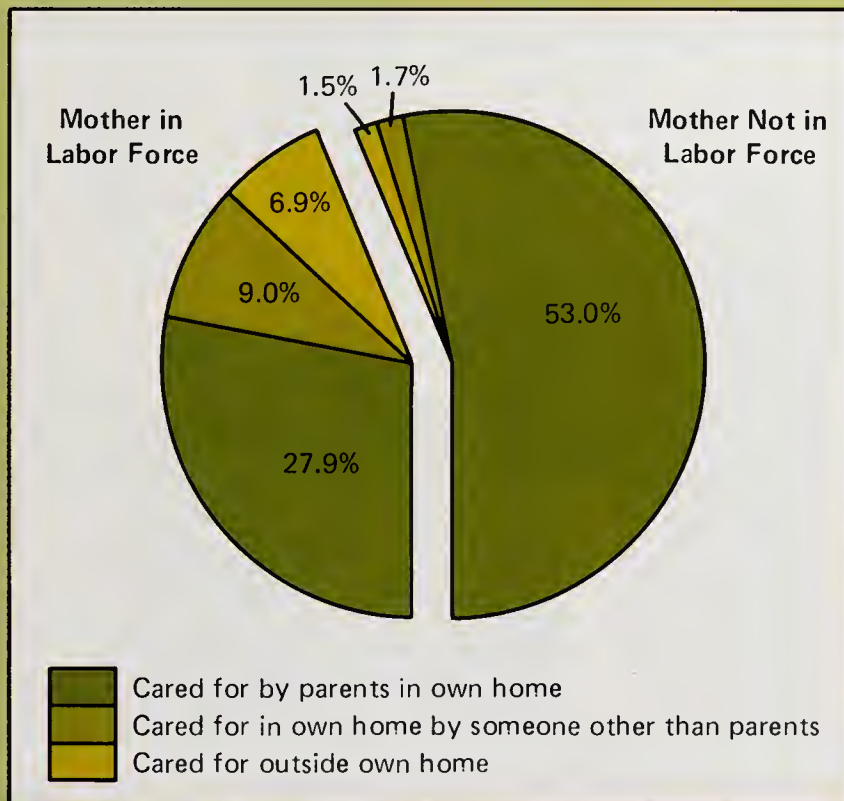
Labor Force Participation Rates of Women Maintaining Families, by Presence and Age of Children: 1970 and 1978



Source: U.S. Bureau of Labor Statistics.

Chart 21.

Daytime Care Arrangements of Children 3 to 13 Years Old, by Labor Force Status of Mother: 1974 and 1975



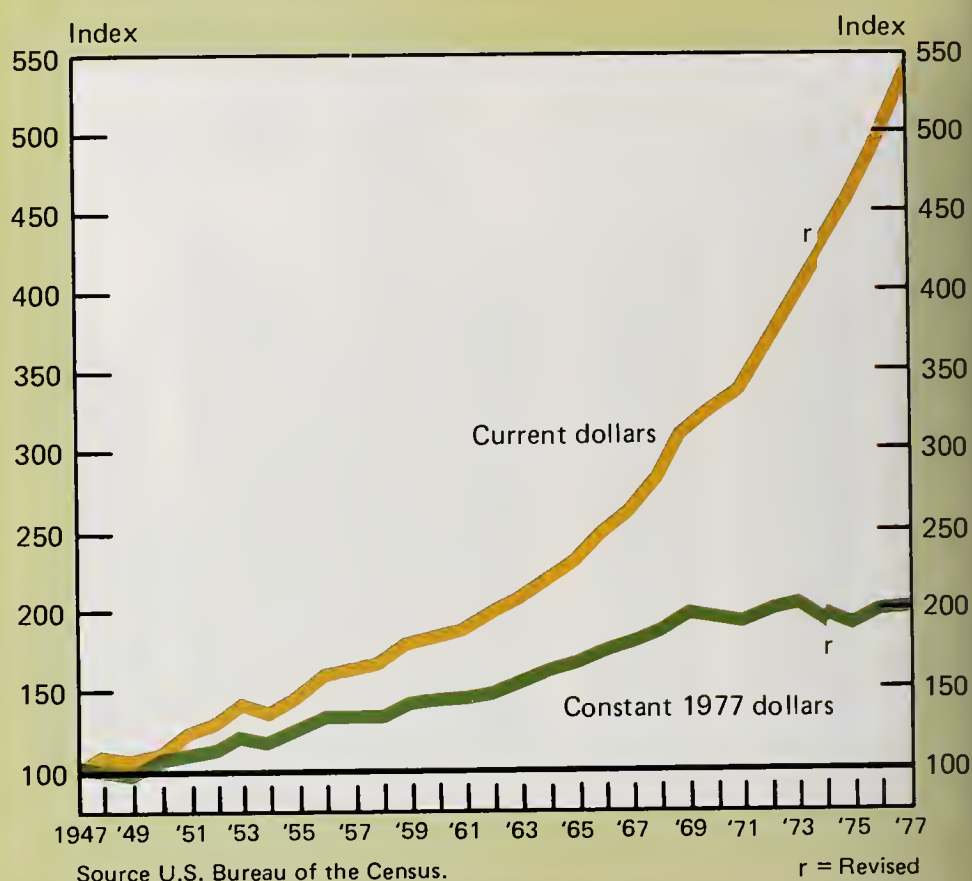
Source: U.S. Bureau of the Census.

Family income, adjusted for inflation, rose by one-third during the 1960's but rose little during the 1970's.

In terms of current dollars, family income rose by three-fifths during the 1970's, from nearly \$10,000 in 1970 to \$16,000 in 1977. Black families had a median income in 1977 of \$9,600, or 57 percent of that for White families, which was \$16,700. For families of Spanish origin, the median was \$11,400, or 68 percent of that for White families.

Chart 22.

Index of Median Family Income in Current and Constant Dollars: 1947-77



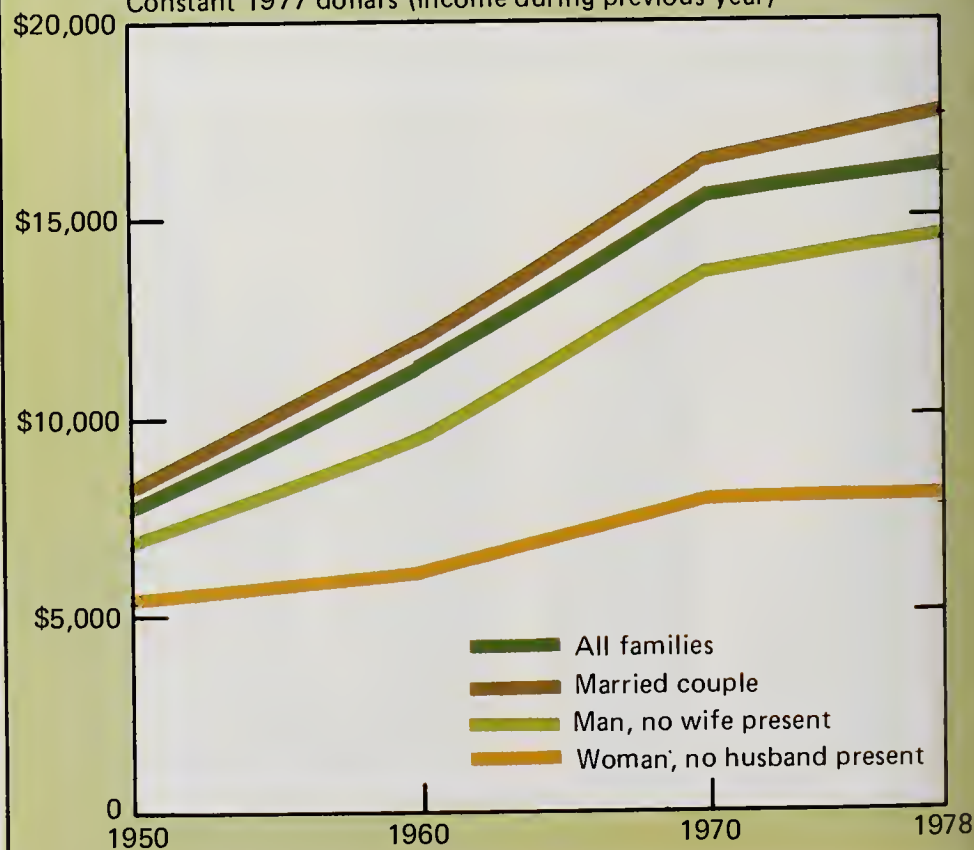
Income of married-couple families increased most.

As more young wives entered the paid labor force, the median income of married-couple families rose by about one-tenth (in dollars of constant value) from 1970 to 1978. So, the median income of these families continued to be more than twice as high as that for families maintained by a lone woman.

Chart 23.

Median Family Income, by Type of Family: 1950-78

Constant 1977 dollars (income during previous year)



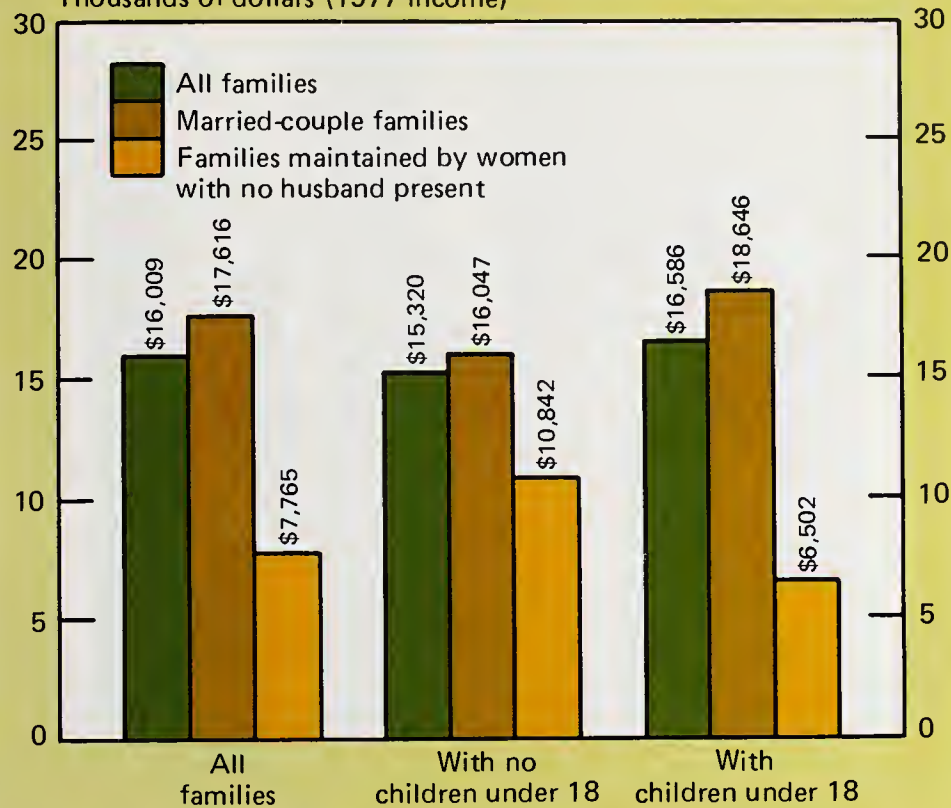
Married-couple families with children in the home have the highest median income.

These families had nearly three times as much income in 1977, on the average, as families maintained by lone mothers (\$18,600 versus \$6,500). Families maintained by women seldom have two or more earners, and a relatively large proportion of these families is maintained by Black women or by women who were not high school graduates.

Chart 24.

Median Family Income, by Presence of Children and Type of Family: 1978

Thousands of dollars (1977 income)



Source: U.S. Bureau of the Census.

More of the family income is being earned by the wife.

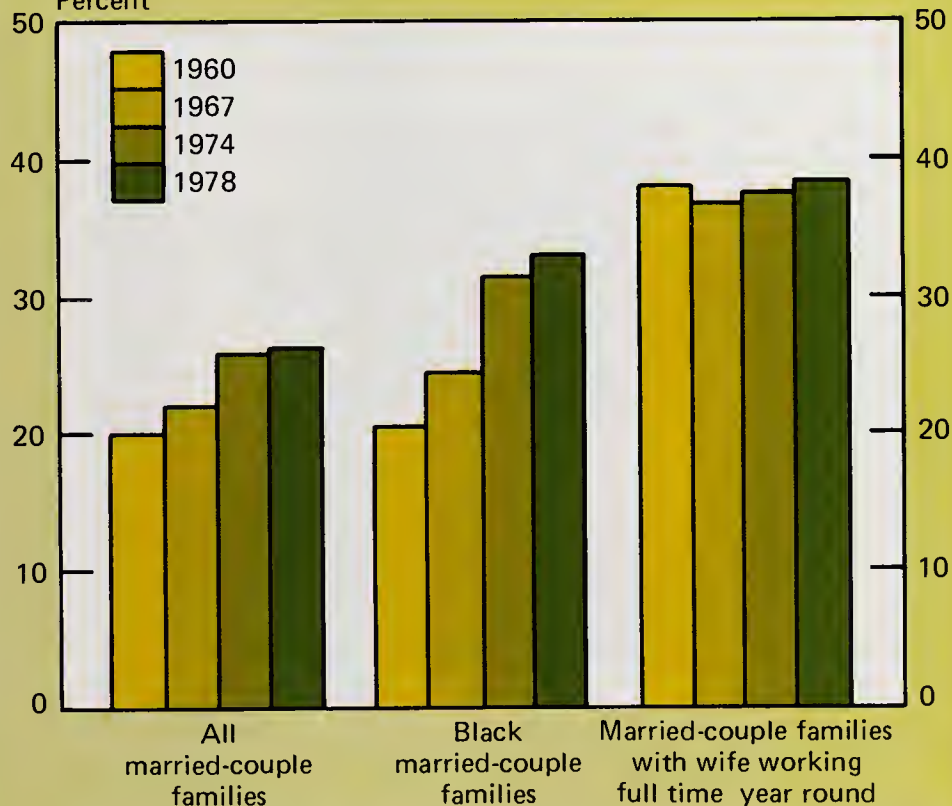
Between 1960 and 1978, the proportion of income of married-couple families earned by the wife rose from 20 percent to 26 percent. The increase for Black families was especially large, but the change was very small for families with the wife working full time year round.

Chart 25.

Percent of Family Income Earned by the Wife: 1960-78

(Income during previous year)

Percent



Source: U.S. Bureau of the Census.

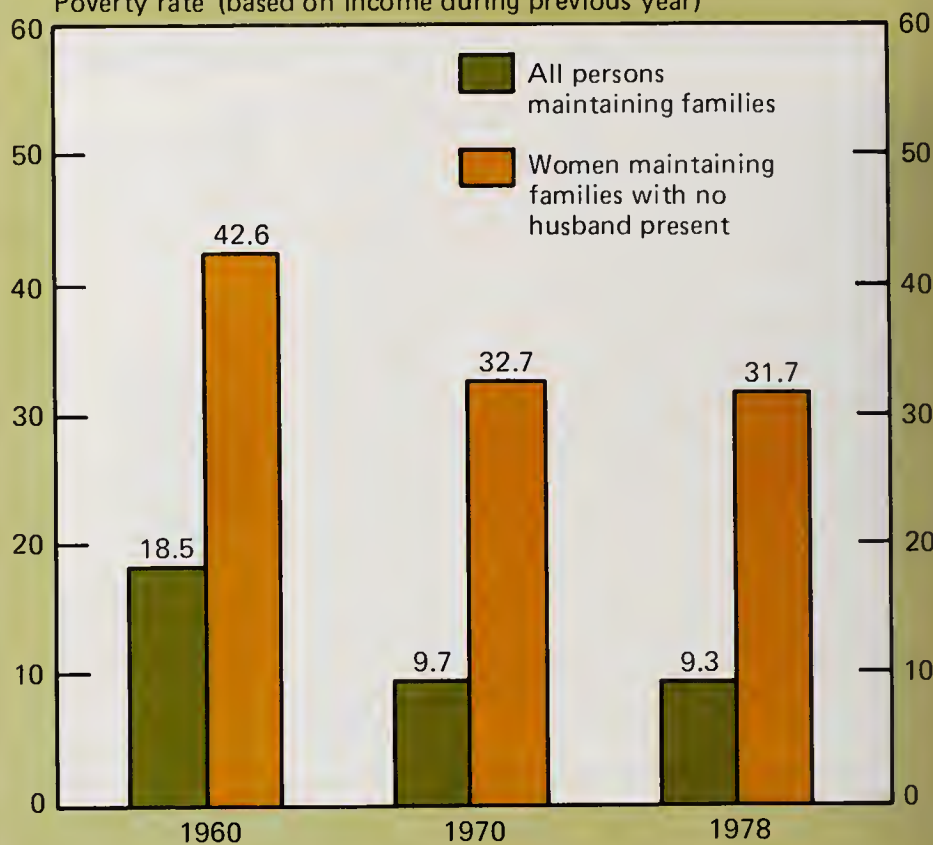
The poverty rate for families dropped by one-half during the 1960's but changed little during the 1970's.

The poverty rate for families was 19 percent in 1960, 10 percent in 1970, and 9 percent in 1978. For families maintained by women, the rate of decline was slower: the corresponding figures being 43 percent, 33 percent, and 32 percent.

Chart 26.

Poverty Rates, by Family Type: 1960, 1970, and 1978

Poverty rate (based on income during previous year)



Source: U.S. Bureau of the Census.

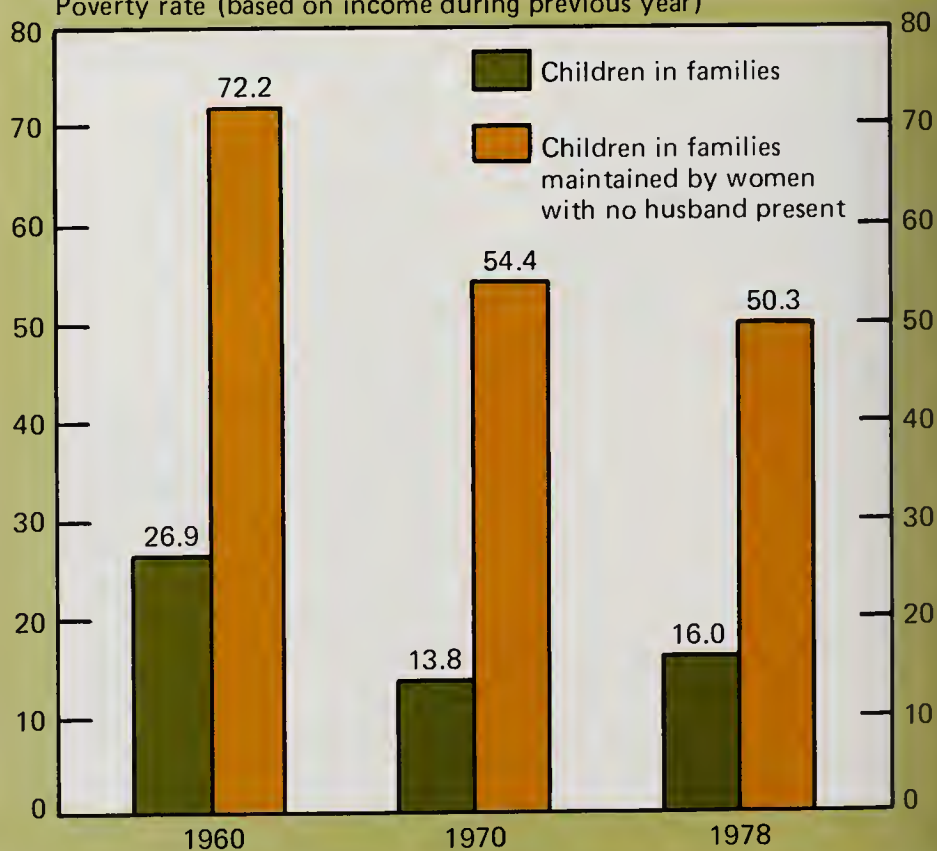
The poverty rate for children dropped by one-half during the 1960's but rose during the 1970's.

In 1960, 27 percent of the children under 18 lived in poverty, compared with 14 percent in 1970 and 16 percent in 1978. Partly through expanded Aid to Families with Dependent Children, the poverty rate among children living only with their mothers declined from 72 percent in 1960 to 50 percent in 1978.

Chart 27.

Children in Poverty, by Family Type: 1960, 1970, and 1978

Poverty rate (based on income during previous year)

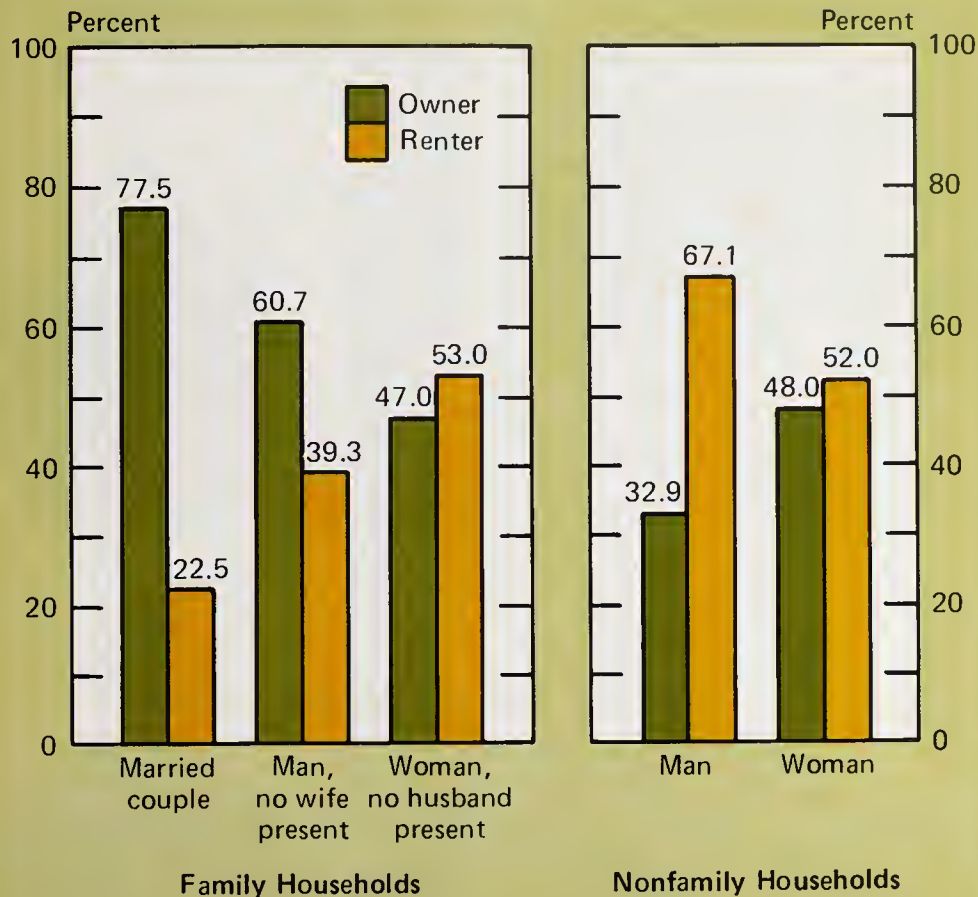


Source: U.S. Bureau of the Census.

over three-fourths of all married couples are homeowners.

In 1978, 78 percent of the married-couple households were homeowners, compared with 47 percent of the family households maintained by women with no husband present.

Chart 28.
Tenure, by Type of Household: 1978

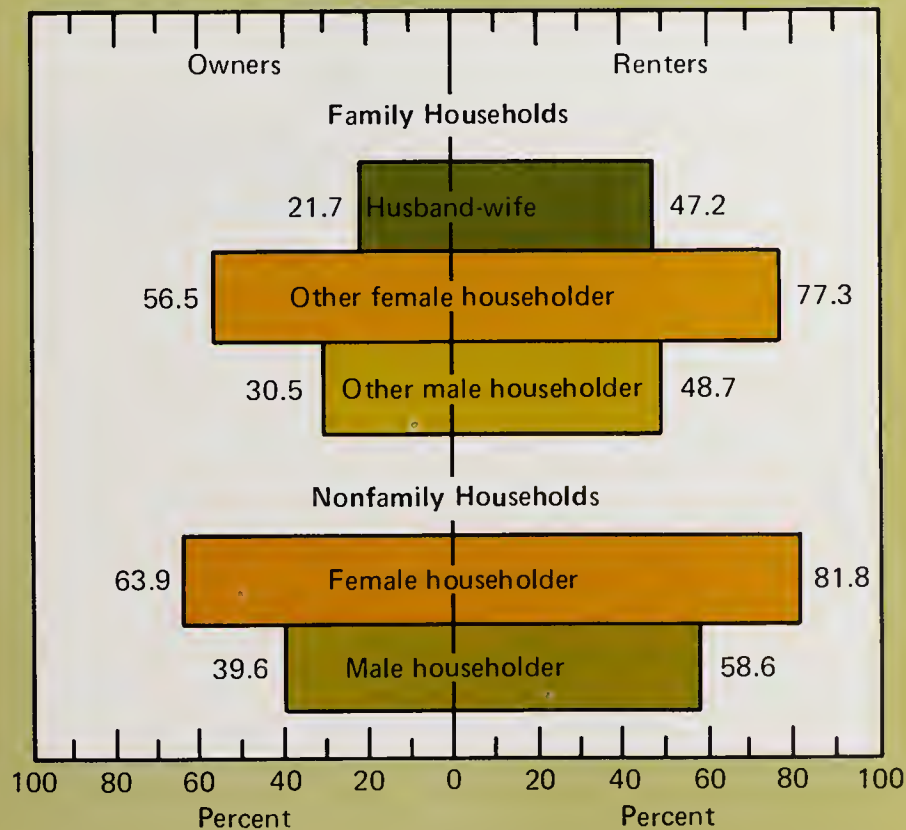


Source: U.S. Bureau of the Census.

A variable proportion of households pay one-fourth or more of their income for shelter.

Only 22 percent of married-couple homeowners pay one-fourth or more of their income for shelter, compared with 82 percent of female renters with no relatives present.

Chart 29.
Households Paying 25 Percent or More of Their Income for Shelter Costs: 1976

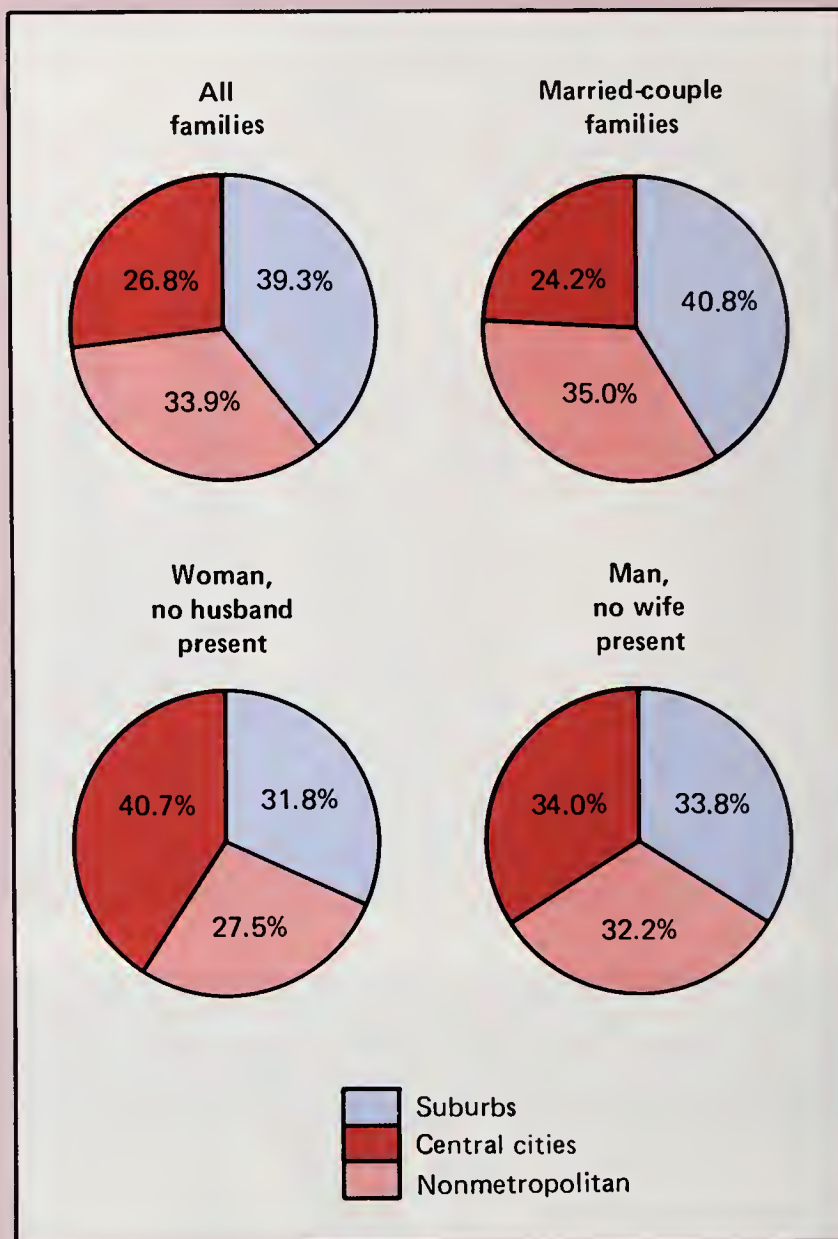


Source: U.S. Bureau of the Census.

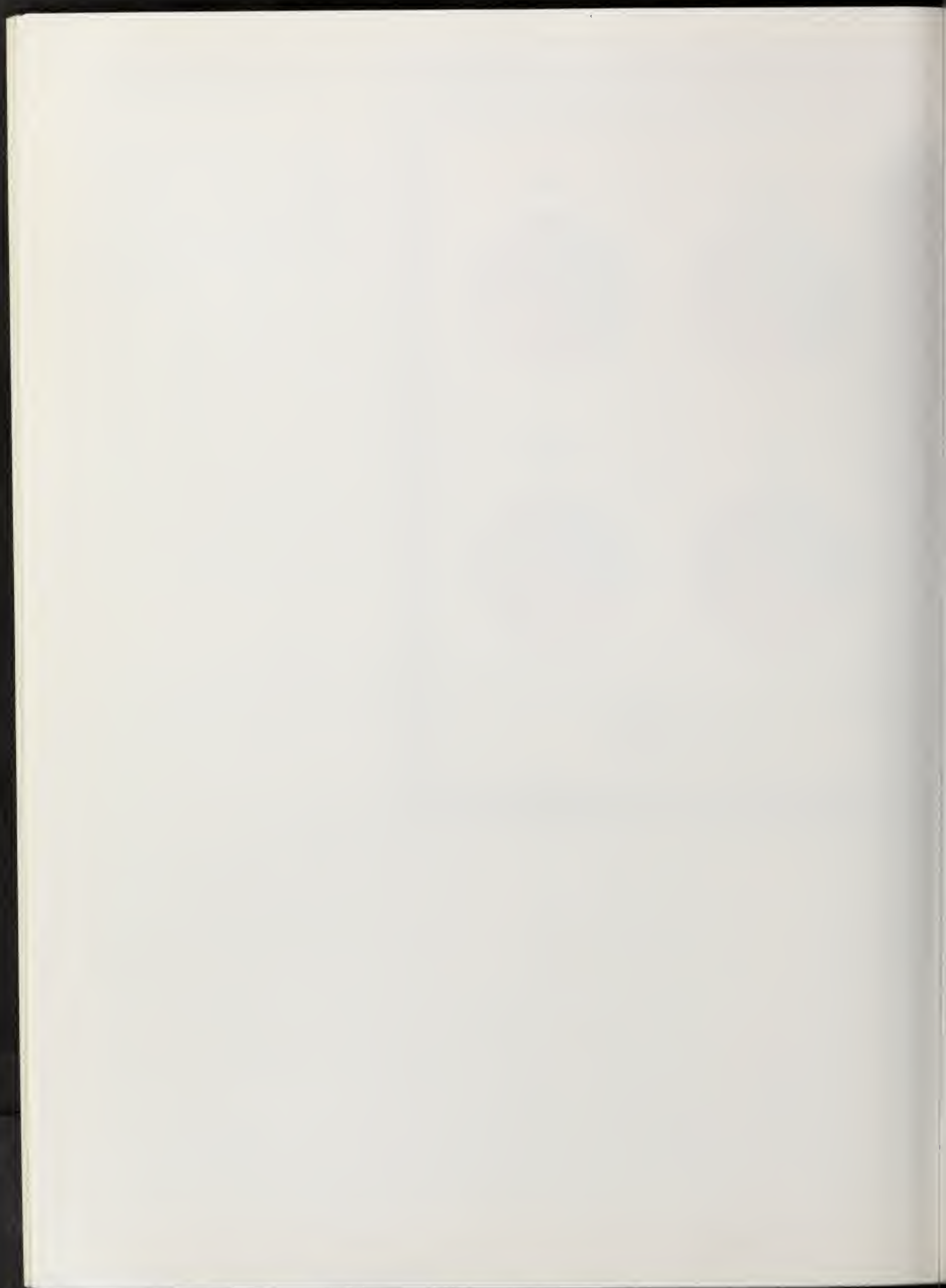
Two-thirds of the families live in metropolitan areas.

Married-couple families constitute the largest proportion living in metropolitan suburbs (41 percent), but families maintained by women with no husband present constitute the largest proportion living in central cities of metropolitan areas (41 percent).

Chart 30.
Metropolitan-Nonmetropolitan
Residence of Families: 1978



Source: U.S. Bureau of the Census.



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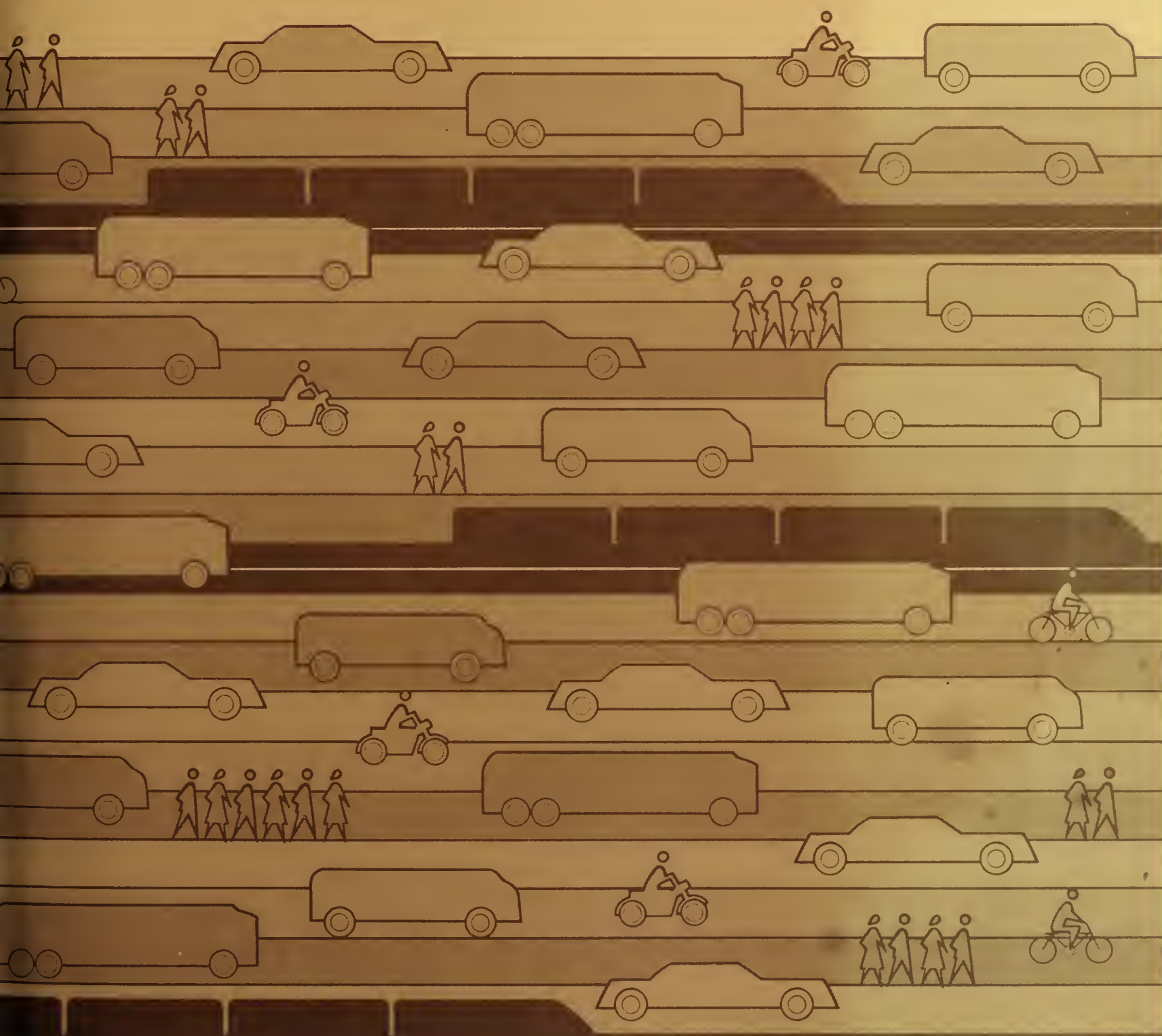


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Issued January 1981



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ACKNOWLEDGMENTS

This report was prepared by **Phillip A. Salopek** under the general direction of **Philip N. Fulton**, Chief of the Journey-to-Work and Migration Statistics Branch. Statistical assistance was provided by **Carol A. Smith**. Computer programming and processing were performed by **Richard M. Jaronski** of the Demographic Surveys Division, under the general direction of **D. Richard Bartlett**. The section on the source and reliability of the estimates was prepared by **William Kolz**, and sampling review was conducted under the supervision of **Donald Luery**, Statistical Methods Division. Publication preparation within Population Division was performed by **Margaret Norris**. In the Publication Services Division, the text and tables were edited by **Paula Coupe**, and the cover was designed by **Beverly Jo Jaquish**. Overall direction was provided by **Arthur J. Norton**, Assistant Chief (Demographic and Social Statistics Programs), Population Division.

Library of Congress Cataloging in Publication Data

United States. Bureau of the Census.
Selected characteristics of travel to work in 20
metropolitan areas, 1977.

(Current population reports: Special studies:
Series P-23; no. 105)
Supt. of Docs. no.: C3.186:P-23/105
1. Urban transportation—United States.
2. Commuting—United States. I. Title. II. Series:
United States. Bureau of the Census. Current
population reports: Special studies: Series
P-23; no. 105.
HA203.A218 no. 105 [HE308] 312'.0973s 80-606807
[388.4'0973]

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by a draft on a U.S. bank. Current Population Reports are sold in two subscription packages: Series P-20, P-23, P-27, and P-60 are available for \$70 per year (\$17.50 additional for foreign mailing); Series P-25, P-26, and P-28 are available for \$90 per year (\$22.50 additional for foreign mailing). The single-copy price of this report is \$2.00.

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SYMBOLS USED IN TABLES

- Represents zero.
 - B Base less than 1,000.
 - X Not applicable.
-

Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1977

(Data from the Travel-to-Work Supplement to the 1977-78 Annual Housing Survey)

INTRODUCTION

This report is one in a series of publications containing information from the Travel-to-Work Supplement to the Annual Housing Survey (AHS). The AHS is conducted for the U.S. Department of Housing and Urban Development, and the supplement was initiated in 1975 under the sponsorship of the U.S. Department of Transportation (DOT).

Travel-to-work data for the following standard metropolitan statistical areas (SMSA's) are included in this report:

Albany-Schenectady-Troy, N.Y.
Anaheim-Santa Ana-Garden Grove, Calif.
Boston, Mass.
Dallas, Tex.
Detroit, Mich.
Fort Worth, Tex.
Los Angeles-Long Beach, Calif.
Madison, Wis.
Memphis, Tenn.-Ark.
Minneapolis-St. Paul, Minn.
Newark, N.J.
Orlando, Fla.
Phoenix, Ariz.
Pittsburgh, Pa.
Saginaw, Mich.
Salt Lake City, Utah
Spokane, Wash.
Tacoma, Wash.
Washington, D.C.-Md.-Va.
Wichita, Kans.

The data presented in this report are preliminary and are based on the first 4 months of interviews from the 11-month sample in Survey Group I. (See page 10 for a listing of the SMSA's contained in each of the three survey groups.) Two earlier reports have been published showing results from the DOT supplement for the 40 SMSA's contained in Survey Groups II and III¹. Interviews for the present study were conducted from April through July 1977, and represent about one-third of the total number of interviews that

will be contained in the final Group I sample. Findings based on preliminary data are more susceptible to sampling error than complete 11-month data, and any analysis or interpretation of the data should be made with this limitation in mind.

MAJOR MODE OF TRANSPORTATION TO WORK

Of the approximately 13.6 million workers residing in the SMSA's surveyed in 1977, about 12.5 million used a car, truck, bus, bicycle, or some other vehicle as their major mode² of transportation to work (table A). People who

²The classification of workers by major mode is based on the mode used for the greatest distance in the work trip.

**Table A. Major Mode of Transportation to Work, for
20 SMSA's: 1977**

(Numbers in thousands. For meaning of symbols, see appendix A)

Mode	Number	Percent ¹
All workers.....	13,658	(X)
Workers using vehicles.....	12,544	100
Auto or truck ²	11,415	91
Drives alone.....	9,062	72
Carpool.....	2,266	18
Shares driving.....	875	7
Drives others.....	520	4
Rides with someone.....	872	7
Public transportation ³	921	7
Bus or streetcar.....	790	6
Subway or elevated.....	83	1
Railroad.....	32	-
Other means ⁴	207	2
Bicycle.....	98	1
Walks only.....	518	[4]
Works at home.....	227	[2]
Not reported.....	370	[3]

¹Percent of workers using vehicles, except percents in brackets [], which are of all workers.

²Includes workers using an auto or truck but not specifying type of riding arrangement.

³Includes workers using taxicabs.

⁴Includes workers using motorcycles and all other means not listed.

¹U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 68, *Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975*, and Series P-23, No. 72, *Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976*, U.S. Government Printing Office, Washington, D.C., 1978.

walked the entire distance from home to work numbered about 500,000 (about 4 percent of the total), while around 200,000 workers (2 percent) worked at home. Approximately 370,000 workers (3 percent) did not report their means of transportation to work.

Among the workers who used vehicles to get to work, a very large majority (72 percent) drove alone in an auto or truck (table A). The next largest group of commuters, people who rode to work in carpools, accounted for an additional 18 percent. Taken together, these two groups of auto or truck users represent an estimated 11.4 million workers in the 20 metropolitan areas, or 91 percent of the vehicle users.

The rate of use of public transportation in the 20 SMSA's was much less than that of driving alone or carpooling, and amounted to about 7 percent of the workers using vehicles (table A). Reflecting the types of public transportation available, the majority of the transit riders rode buses to work (about 790,000 workers), followed in numbers by people using subways (83,000) and commuter railroads (32,000).

Use of automobiles and trucks. Among persons using vehicles to get to work in the 20 SMSA's in 1977, 82 percent rode to work in autos (table B), while 9 percent commuted in trucks of 1-ton capacity or less. The SMSA with the highest rate of auto use among the 20 metropolitan areas was Detroit, where

88 percent of the vehicle users commuted by car. The Salt Lake City SMSA, however, exhibited one of the lowest rates of auto use, but even there, 3 out of 4 commuters traveled to work in a car. (The rate of auto use in the Salt Lake City area was not significantly different than that found in the Boston, Madison, Phoenix, Pittsburgh, or Spokane SMSA's.)

The rate of truck use in the journey to work varied among the 20 SMSA's from lows of 3 percent in Boston and 4 percent in Newark and Washington, D.C. to a high of 20 percent in Phoenix (table B). In general, the use of trucks was higher in the Western and Southwestern SMSA's than in the other metropolitan areas. In addition to Phoenix, relatively high rates were found in Spokane (18 percent), Tacoma (17 percent), Salt Lake City (17 percent), Wichita (17 percent), Dallas (16 percent), and Fort Worth (16 percent). Exceptions to this general pattern were found in Anaheim-Santa Ana-Garden Grove (11 percent) and Los Angeles-Long Beach (10 percent), each with a relatively low rate of truck use compared with other Western areas, and in Memphis, Saginaw, and Orlando with relatively high rates (15, 14, and 12 percent, respectively) compared with the remaining SMSA's outside the West. The general pattern of higher truck use in Western and Southwestern SMSA's is consistent with the findings shown in the earlier reports from the Travel-to-Work Supplement.

Table B. Workers Commuting by Automobile or Truck, for 20 SMSA's and SMSA Transportation Groups: 1977

(Numbers in thousands. SMSA's as of the 1970 census. For explanation of transportation groups, see appendix A)

SMSA's and SMSA groups	Workers using vehicles					
	Number			Percent		
	Total ¹	Auto	Truck	Total ¹	Auto	Truck
Total, 20 SMSA's.....	12,544	10,247	1,168	100	82	9
Group A.....	1,531	1,204	53	100	79	4
Boston.....	930	704	31	100	76	3
Newark.....	601	500	23	100	83	4
Group B.....	6,982	5,810	564	100	83	8
Anaheim-Santa Ana-Garden Grove.....	806	684	86	100	85	11
Detroit.....	1,500	1,320	101	100	88	7
Los Angeles-Long Beach.....	2,753	2,286	268	100	83	10
Pittsburgh.....	716	561	56	100	78	8
Washington, D.C.....	1,206	960	53	100	80	4
Group C-North.....	1,059	875	77	100	83	7
Albany-Schenectady-Troy.....	270	232	21	100	86	8
Minneapolis-St. Paul.....	789	643	56	100	82	7
Group C-South and West.....	1,523	1,221	241	100	80	16
Dallas.....	730	582	119	100	80	16
Fort Worth.....	359	292	57	100	81	16
Memphis.....	303	244	44	100	81	15
Tacoma.....	132	104	22	100	79	17
Group D.....	1,449	1,137	233	100	79	16
Madison.....	133	103	10	100	77	8
Orlando.....	211	176	26	100	83	12
Phoenix.....	478	367	94	100	77	20
Saginaw.....	79	67	11	100	85	14
Salt Lake City.....	259	195	43	100	75	17
Spokane.....	114	88	20	100	77	18
Wichita.....	175	141	29	100	81	17

¹Includes workers using public transportation or other means, not shown separately.

driving alone, carpooling, and public transportation use. Among the 20 metropolitan areas surveyed, the rate of driving to work alone was highest in the Saginaw metropolitan area (82 percent) (table C). The lowest rates of driving alone were found in the Washington, D.C. (58 percent) and Boston (59 percent) SMSA's.

In conjunction with the low rates of driving alone, workers in the Washington, D.C. SMSA exhibited one of the highest rates of carpooling (25 percent) (table C). Although not significantly different than Washington, the use of carpools was also relatively high in the Albany-Schenectady-Troy SMSA (23 percent), compared with most of the other areas. One of the lowest rates of carpool use, however, was found in the Saginaw SMSA (15 percent), although not significantly different from carpool rates in Anaheim, Detroit, Los Angeles, Newark, Phoenix, and Pittsburgh.

The use of public transportation to get to work is determined, to a large degree, by the availability and extent of the system. In the 20 surveyed areas, transit use was greatest among workers in the Boston SMSA (19 percent), followed by the Washington, D.C. (15 percent), Pittsburgh (13 percent), and Newark (13 percent) metropolitan areas (table C). (The differences between Pittsburgh and Washington and between Pittsburgh and Newark were not statistically significant.)

Very low rates of public transit use (less than 3 percent of the vehicle users) were found in a number of metropolitan areas, with the lowest rates occurring in Saginaw and Phoenix.

CHANGES IN MAJOR MODE OF TRANSPORTATION TO WORK

Changes in the use of public transportation: 1970-77. Comparison of the survey data with data from the 1970 census indicates that the use of public transportation decreased by 3 percentage points, from 10.3 to 7.3 percent, among the 20 SMSA's during the period (table D). This result is consistent with the findings of the two earlier reports from the Travel-to-Work Supplement, which showed a 3.4-percentage-point decline among 21 SMSA's during the 1970-75 period³, and a 5.6-percentage-point decline among 20 SMSA's from 1970 to 1976⁴.

³U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 68, *Selected Characteristics of Travel to Work in 21 Metropolitan Areas: 1975*, U.S. Government Printing Office, Washington, D.C., 1978, p. 4.

⁴U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 72, *Selected Characteristics of Travel to Work in 20 Metropolitan Areas: 1976*, U.S. Government Printing Office, Washington, D.C., 1978, pp. 3-4.

Table C. Workers Driving Alone, Workers Riding in Carpools, and Workers Using Public Transportation, for 20 SMSA's and SMSA Transportation Groups: 1977

(Numbers in thousands. SMSA's as of the 1970 census. For explanation of transportation groups and meaning of symbols, see appendix A)

SMSA's and SMSA groups	Workers using vehicles							
	Number				Percent			
	Total ¹	Drives alone	Carpool	Public transportation	Total ¹	Drives alone	Carpool	Public transportation
Total, 20 SMSA's.....	12,544	9,062	2,266	921	100	72	18	7
Group A.....	1,531	968	271	253	100	63	18	17
Boston.....	930	551	176	178	100	59	19	19
Newark.....	601	417	95	75	100	69	16	13
Group B.....	6,982	5,088	1,241	496	100	73	18	7
Anaheim-Santa Ana-Garden Grove.....	806	640	128	15	100	79	16	2
Detroit.....	1,500	1,172	235	63	100	78	16	4
Los Angeles-Long Beach.....	2,753	2,090	452	145	100	76	16	5
Pittsburgh.....	716	486	124	94	100	68	17	13
Washington, D.C.....	1,206	702	302	178	100	58	25	15
Group C-North.....	1,059	743	205	85	100	70	19	8
Albany-Schenectady-Troy.....	270	188	62	15	100	70	23	6
Minneapolis-St. Paul.....	789	555	143	70	100	70	18	9
Group C-South and West.....	1,523	1,166	285	45	100	77	19	3
Dallas.....	730	565	128	22	100	77	18	3
Fort Worth.....	359	275	70	6	100	77	20	2
Memphis.....	303	224	62	14	100	74	21	5
Tacoma.....	132	101	24	3	100	77	18	2
Group D.....	1,449	1,097	265	42	100	76	18	3
Madison.....	133	89	24	12	100	67	18	9
Orlando.....	211	162	39	4	100	77	19	2
Phoenix.....	478	376	82	4	100	79	17	1
Saginaw.....	79	65	12	-	100	82	15	-
Salt Lake City.....	259	183	54	16	100	71	21	6
Spokane.....	114	87	20	4	100	76	18	4
Wichita.....	175	136	34	3	100	78	19	2

¹Includes workers using other means, not separately identified.

Among the 20 SMSA's surveyed in 1977, significant declines in the use of public transportation to get to work occurred in 15 areas (table D). (There is some evidence that the rate of transit use also declined in the Spokane SMSA.) Significant increases in the use of public transportation occurred in the Salt Lake City and Anaheim-Santa Ana-Garden Grove SMSA's, while the changes in the Madison and Minneapolis-St. Paul areas were not statistically significant. The largest declines in public transit use occurred in the Newark and Memphis SMSA's. In Newark, transit use went from 20.3 percent of the vehicle users in 1970 to 12.5 percent in 1977 (a drop of 7.8 percentage points), while in Memphis the rate of public transportation use declined 6.3 percentage points, from 10.9 percent in 1970 to 4.5 percent in 1977. (The difference between the declines in Newark and Memphis was not statistically significant.)

The largest increase in the use of public transportation, 3.6 percentage points, occurred in the Salt Lake City SMSA,

where the proportion of vehicle users riding transit went from 2.4 percent in 1970 to 6.1 percent in 1977 (table D). The Anaheim-Santa Ana-Garden Grove SMSA also experienced a gain in public transportation use, from a miniscule 0.5 percent in 1970 to 1.9 percent in 1977.

Recent changes in major mode of transportation to work. A very large majority of the workers who were interviewed in the 1977 survey had not changed their principal means of commuting to work in the 12 months prior to the enumeration. In addition, the magnitude of any changes between modes was quite small. However, among workers who did change modes during the period, the survey results are at least indicative of some general patterns of choice.

Across the 20 SMSA's surveyed in 1977, 98 percent of the workers who drove alone to work in 1976 were still driving alone in 1977 (table E), while 1 percent had joined carpools, and 1 percent were riding public transportation.

Table D. Change in Commuter Use of Public Transportation for 20 SMSA's and SMSA Transportation Groups: 1970 to 1977

(Numbers in thousands. SMSA's as of the 1970 census. For explanation of transportation groups and meaning of symbols, see appendix A)

SMSA's and SMSA groups	1977			1970			1970 to 1977	
	Vehicle users			Vehicle users			Change in use of public transportation	
	Total	Using public transportation		Total	Using public transportation		Percentage-point difference ²	Standard error of difference
		Total	Percent of total vehicle users		Total	Percent of total vehicle users ¹		
Total, 20 SMSA's.....	12,544	921	7.3	11,429	1,177	10.3	-3.0	0.2
Group A.....	1,531	253	16.5	1,670	363	21.7	-5.2	0.6
Boston.....	930	178	19.2	991	225	22.7	-3.5	0.7
Newark.....	601	75	12.5	679	138	20.3	-7.8	1.0
Group B.....	6,982	496	7.1	6,435	611	9.5	-2.4	0.2
Anaheim-Santa Ana-Garden Grove....	806	15	1.9	516	2	0.5	1.5	0.3
Detroit.....	1,500	63	4.2	1,442	126	8.7	-4.5	0.4
Los Angeles-Long Beach.....	2,753	145	5.3	2,578	155	6.0	-0.7	0.3
Pittsburgh.....	716	94	13.1	762	124	16.3	-3.1	1.1
Washington, D.C.....	1,206	178	14.8	1,137	204	18.0	-3.2	0.5
Group C-North.....	1,059	85	8.0	923	89	9.6	-1.6	0.5
Albany-Schenectady-Troy.....	270	15	5.5	248	21	8.6	-3.1	0.6
Minneapolis-St. Paul.....	789	70	8.9	675	67	10.0	-1.1	0.7
Group C-South and West.....	1,523	45	2.9	1,314	83	6.3	-3.4	0.2
Dallas.....	730	22	3.1	622	41	6.7	-3.6	0.4
Fort Worth.....	359	6	1.7	296	8	2.8	-1.1	0.3
Memphis.....	303	14	4.5	263	28	10.9	-6.3	0.6
Tacoma.....	132	3	2.0	134	5	3.4	-1.5	0.4
Group D.....	1,449	42	2.9	1,087	32	2.9	-	0.2
Madison.....	133	12	8.9	99	8	8.1	0.7	0.7
Orlando.....	211	4	1.8	153	6	3.7	-1.9	0.3
Phoenix.....	478	4	0.7	343	5	1.3	-0.6	0.3
Saginaw.....	79	-	0.3	69	1	1.5	-1.2	0.1
Salt Lake City.....	259	16	6.1	191	5	2.4	3.6	0.5
Spokane.....	114	4	3.6	91	4	4.6	-1.0	0.5
Wichita.....	175	3	1.8	141	4	2.5	-0.8	0.3

¹Standard error of percents is less than 0.05 in each case.

²The percentage-point differences in the use of public transportation noted in this table may be affected by the fact that workers who lived in group quarters are included in the 1970 census data, but not in the AHS sample; see the discussion on page 11. A percentage-point difference is significant if it is twice as large as its standard error.

Among workers who used carpools to get to work in 1976, 95 percent were still pooling in 1977, 3 percent had switched to driving alone, and 1 percent were using public transportation a year later.

For workers who were using public transportation to get to work in 1976, however, the proportion still using transit in 1977 (83 percent) was much smaller than the corresponding figures for driving alone and carpooling (table E). Nine percent of the 1976 transit users had switched to driving alone in the succeeding year, another 5 percent were riding to work in carpools, and 2 percent were using other means of transportation to get to work in 1977.

SATISFACTION WITH MAJOR MODE OF TRANSPORTATION TO WORK

Workers enumerated in the survey were asked to specify their satisfaction with their principal means of transportation to work, in conjunction with whether or not they had recently changed modes. Workers who had changed modes in the past year were to report how satisfied they were with their new mode compared with their former mode. Workers who had not changed modes in the past year were to report their current degree of satisfaction, compared with the same time last year.

Satisfaction for workers who did not change modes. As expected, the great majority of workers (83 percent) whose means of transportation had not changed during the previous year reported that their satisfaction with that mode had not changed either (table F). However, 7 percent of the workers who had not changed modes reported that they were more satisfied than last year, while 6 percent were less satisfied with their mode in 1977 than they had been in 1976.

The last column of table F presents the ratio of workers who were more satisfied with their mode to those who were less satisfied than a year earlier. Workers who reported "about the same satisfaction," and workers in the "Don't know, did not work last year, or no response" category are

excluded from the ratios. Therefore, the ratios do not reflect the overall degree of satisfaction felt by users of the various modes of transportation.

What the ratios in table F provide is a summary measure for each mode of the net balance of workers on the satisfaction item. Ratios of less than 1.00 occur, for example, when the number of workers who were less satisfied with a particular mode was greater than the number who were more satisfied.

The survey results show that among the relatively small number of workers whose mode of transportation to work did not change, but whose satisfaction did change, the satisfaction ratio is 1.17 (table F). This ratio indicates that among the approximately 1.7 million workers who experienced a change in satisfaction without a corresponding change in mode, the number who were more satisfied was about 17 percent larger than the number who were less satisfied.

As might be expected, the ratios in table F vary from one means of transportation to another. In general, the lowest ratios are found among the public transportation modes, with the ratio for each type of public transportation well below 1.00 and the total for all types being 0.46. Thus, among the public transit riders in the sample, the number whose satisfaction increased over the period was offset by a larger number whose satisfaction with public transit decreased between 1976 and 1977. In contrast, the ratios for auto or truck users are greater than 1.00, indicating that a greater number of these workers were more satisfied than less satisfied in 1977.

Satisfaction with change of major mode. As expected, workers who changed their means of transportation in the preceding year were much more likely to report an increase in satisfaction than workers who had not changed modes. Among workers who changed, 55 percent reported that they were more satisfied with their new mode of transportation to work (table G), while the difference between workers who reported "about the same satisfaction" (22 percent), and

Table E. Mode of Transportation to Work Last Year, by Percent Using Current Modes, for 20 SMSA's: 1977

Mode last year (1976)	Current mode (1977)						
	Workers reporting current mode (thousands)	Total (percent)	Auto or truck			Public transportation ²	Other means ³
			Total ¹	Drives alone	Carpool		
Workers reporting mode used last year.....	13,069	100	86	68	17	7	7
Auto or truck ¹	11,163	100	98	79	19	1	1
Drove alone.....	8,876	100	99	98	1	1	1
Carpool.....	2,152	100	98	3	95	1	1
Public transportation ²	975	100	15	9	5	83	2
Other means ³	931	100	12	9	3	1	86

¹Includes workers using an auto or truck but not specifying type of riding arrangement.

²Bus or streetcar, subway or elevated, railroad, and taxicab.

³Bicycle, motorcycle, walks to work, works at home, and all other means not listed.

Table F. Satisfaction With Major Mode of Transportation for Workers Who Did Not Change Modes in the Last Year, for 20 SMSA's: 1977

(For meaning of symbols, see appendix A)

Mode	Satisfaction with mode						
	Total (thousands)	Percent distribution					Ratio of more satisfied to less satisfied
		Total	More satisfied	About the same satisfac- tion	Less satisfied	Don't know, did not work last year, or no response	
Workers who did not change modes in the last year.....	12,683	100	7	83	6	3	1.17
Auto or truck ¹	10,781	100	8	84	6	2	1.27
Drives alone.....	8,665	100	8	84	6	2	1.29
Carpool.....	2,040	100	8	82	6	4	1.25
Public transportation ²	800	100	6	77	13	4	0.46
Bus or streetcar.....	687	100	6	77	13	4	0.50
Subway or elevated.....	72	100	4	74	17	5	0.21
Railroad.....	28	100	5	77	18	-	0.27
Other means ³	142	100	8	76	6	10	1.43
Walks only.....	445	100	5	85	4	6	1.33
Works at home.....	205	100	5	84	1	10	6.64
Not reported.....	310	100	4	86	4	5	0.91

¹Includes workers using an auto or truck but not specifying type of riding arrangement.

²Includes workers using taxicabs.

³Bicycle, motorcycle, and all other means not listed.

Table G. Satisfaction With Change for Workers Who Changed Their Major Mode of Transportation in the Last Year, for 20 SMSA's: 1977

(For meaning of symbols, see appendix A)

Nature of mode change	Satisfaction with mode change						
	Total (thousands)	Percent distribution					Ratio of more satisfied to less satisfied
		Total	More satisfied	About the same satisfac- tion	Less satisfied	Don't know, did not work last year, or no response	
Workers who changed modes and reported former and current mode.	652	100	55	22	20	3	2.68
Auto or truck to auto or truck.....	162	100	51	27	21	1	2.42
Drives alone to carpool.....	89	100	49	25	25	1	2.00
Carpool to drives alone.....	73	100	52	30	16	1	3.20
Auto or truck ¹ to public transportation ²	81	100	31	22	45	1	0.68
Drives alone to public transportation.	53	100	37	18	43	2	0.87
Carpool to public transportation.....	22	100	24	33	43	-	0.55
Public transportation to auto or truck ¹ .	144	100	72	16	11	1	6.47
Public transportation to drives alone.	92	100	69	16	15	1	4.72
Public transportation to carpool.....	50	100	77	15	5	2	15.00
Other changes ³	266	100	56	22	18	5	3.13

¹Includes workers using an auto or truck but not specifying type of riding arrangement.

²Bus or streetcar, subway or elevated, railroad, and taxicab.

³Changes from all other means to auto or truck; from all other means to public transportation; from auto or truck to all other means; from public transportation to all other means; from one means of public transportation to another; and changes among all other means not listed.

those who were less satisfied with their current mode than they had been with their former mode (20 percent), was not statistically significant.

The satisfaction ratio for the approximately 650,000 workers whose means of transportation changed in the last year was 2.68, indicating that the number who were more satisfied was about 2½ times larger than the number who were less satisfied as a result of the change.

Among the specific types of mode changes presented in table G, the highest satisfaction ratio (15.00) was found among workers who changed from public transportation in 1976 to a carpool in 1977. Persons who changed to driving alone from public transportation were also very likely to experience an increase rather than a decrease in their satisfaction, as evidenced by a satisfaction ratio of 4.72. (Although not statistically significant, there is some evidence of a difference between these two ratios.) Ratios of this magnitude indicate that a very large majority of these workers were more satisfied with carpooling or driving alone than they had been with using public transportation.

The satisfaction ratios for workers who changed to public transportation, however, are much lower than those noted above. For workers who drove alone in 1976 and changed to public transportation in 1977, the number of persons more satisfied with the change was only about 87 percent as large as the number less satisfied (table G). The ratio for workers who changed to public transportation from carpooling, although not significantly different than that for the drive-alone-to-public-transit changers, indicates that the number of workers who were more satisfied with public transportation than they had been with carpooling was only about half as large as the number who were less satisfied.

TRIP LENGTH AND TRIP DURATION

Trip length. The median distance from home to work for all workers in the 20 SMSA's surveyed in 1977 was 7.7 miles (table H). The difference between workers who traveled to work in trucks (9.3 miles) and workers who traveled to work in autos (8.3 miles) was not statistically significant, nor was there a significant difference in distance traveled between workers in carpools (9.4 miles) and those who drove alone (8.2 miles). Among workers who carpooled to work, those who shared the driving with other members of the carpool traveled farthest (12.6 miles), ostensibly because the motivation to spread commuting costs among several persons is greatest where the costs are highest, i.e., where the distance is longest. Workers who always drove other passengers had the next longest commutes, on the average (9.3 miles), while the shortest trips were made by workers who rode with someone else without doing any of the driving themselves (6.5 miles). The difference between the latter two medians may be due to the fact that workers who always drive others have at least one other person whom they must either pick up on the way to work or drop off before continuing on to their own workplace. Thus the driver would tend to travel farther than the passenger. For the same reason, workers who were always passengers in the carpool generally had shorter worktrips because whenever their place of residence or place of work

was different than that of the driver, the passengers would either have been picked up after the driver had traveled some distance or dropped off before the driver's commute had been completed.

The median distance to work for people riding public transportation in the 20 SMSA's was 6.9 miles (table H). People riding a bus or subway traveled about the same distance as the median for all public transit users (6.7 and 7.1 miles, respectively), while workers who rode a commuter railroad traveled much farther, on the average, to get to work (20.9 miles). The median trip length for workers using other means of transportation to work, such as bicycles and motorcycles, was 3.5 miles, while people who walked the entire distance to work generally lived less than a mile from their workplace.

Table I presents the median distance from home to work in 1977 for each of the 20 metropolitan areas surveyed. One of the longest median trip lengths occurred in the Anaheim-Santa Ana-Garden Grove SMSA (10 miles), although commuters in Dallas (9.2 miles), Detroit (8.6 miles), Fort Worth (8.6 miles), Tacoma (8.4 miles), and Washington, D.C. (8.4 miles) traveled comparable distances, on the average, to get to work. However, relatively short median trip lengths occurred in Madison (4.8 miles), Pittsburgh (5.6 miles), Saginaw (5.8 miles), Spokane (5.8 miles), Albany-Schenectady-Troy (6.1 miles), and Boston (6.1 miles).

Table J, covering four of the largest SMSA's surveyed, presents additional data on trip length from the point of view

Table H. Median Distance From Home to Work, by Major Mode of Transportation, for 20 SMSA's: 1977

Mode	Distance (miles)	
	Median	Standard error
Total ¹	7.7	0.1
Workers using vehicles.....	8.2	0.1
Auto.....	8.3	0.1
Truck.....	9.3	0.2
Auto or truck ²	8.4	0.1
Drives alone.....	8.2	0.1
Carpool.....	9.4	0.2
Shares driving.....	12.6	0.3
Drives others.....	9.3	0.3
Rides with someone.....	6.5	0.2
Public transportation ³	6.9	0.2
Bus or streetcar.....	6.7	0.2
Subway or elevated.....	7.1	0.5
Railroad.....	20.9	1.4
Other means ⁴	3.5	0.2
Walks only.....	0.6	0.1
Not reported.....	6.6	0.4

¹Excludes workers with no fixed place of work, workers who worked at home, and workers who did not report distance to work.

²Includes workers using an auto or truck but not specifying type of riding arrangement.

³Includes workers using taxicabs.

⁴Bicycle, motorcycle, and all other means not listed.

Table I. Median Distance From Home to Work, for 20 SMSA's and SMSA Transportation Groups: 1977

(Numbers in thousands. SMSA's as of the 1970 census.
For explanation of transportation groups, see appendix A)

SMSA's and SMSA groups	Total ¹	Distance (miles)	
		Median	Standard error
Total, 20 SMSA's....	11,917	7.7	0.1
Group A.....	1,524	6.3	0.2
Boston.....	946	6.1	0.2
Newark.....	578	6.6	0.3
Group B.....	6,620	8.1	0.1
Anaheim-Santa Ana-Garden Grove.....	717	10.0	0.3
Detroit.....	1,438	8.6	0.2
Los Angeles-Long Beach..	2,553	8.0	0.2
Pittsburgh.....	753	5.6	0.3
Washington, D.C.....	1,159	8.4	0.1
Group C-North.....	1,016	7.1	0.2
Albany-Schenectady-Troy.	265	6.1	0.3
Minneapolis-St. Paul....	750	7.4	0.3
Group C-South and West....	1,415	8.7	0.1
Dallas.....	682	9.2	0.3
Fort Worth.....	329	8.6	0.3
Memphis.....	280	7.8	0.3
Tacoma.....	124	8.4	0.3
Group D.....	1,342	6.9	0.1
Madison.....	129	4.8	0.1
Orlando.....	191	7.6	0.3
Phoenix.....	440	7.7	0.3
Saginaw.....	76	5.8	0.3
Salt Lake City.....	238	7.4	0.2
Spokane.....	107	5.8	0.3
Wichita.....	163	6.4	0.2

¹Excludes workers with no fixed place of work, workers who worked at home, and workers who did not report distance to work.

of total commuter miles traveled to work on an average commuting day. Workers living in the Los Angeles-Long Beach SMSA traveled the greatest aggregate distance to work (a function primarily of the population size of Los Angeles relative to the other SMSA's): just over 27 million miles. Total commuter miles in the Detroit and Washington, D.C. SMSA's were about 15.5 million miles and about 12.5 million miles, respectively. Workers in the Boston metropolitan area, in comparison, traveled fewer total miles to work on a typical commuting day than workers in the other three large SMSA's (about 8.5 million miles).

The proportion of total commuter miles accounted for by workers using an auto or truck was very high in the Detroit and Los Angeles-Long Beach metropolitan areas (about 93 percent), while in the Washington, D.C. and Boston SMSA's the corresponding figures were 86 percent and 77 percent, respectively (table J). In the Detroit and Los Angeles-Long Beach areas about 75 percent of the total mileage traveled to work was attributable to people driving alone, whereas 55 percent of the total mileage in Boston and Washington, D.C. was attributable to this means of transportation.

The high proportion of total commuter miles attributable to workers driving alone in the Detroit and Los Angeles-Long Beach SMSA's would be expected to mean fewer miles by carpools and public transportation in these SMSA's, compared with the Boston and Washington metropolitan areas. In general, this is the case as carpools accounted for the smallest proportion of total commuter mileage (table J) in the Detroit SMSA (17 percent), and there is some evidence that the proportion in Los Angeles-Long Beach due to carpools (20 percent) is less than the comparable figure for Boston (21 percent). Carpools accounted for the largest proportion of the aggregate distance to work in the Wash-

Table J. Total Commuter Miles Traveled From Home to Work, by Major Mode of Transportation, for Four SMSA's: 1977

(Number of miles in thousands. For meaning of symbols, see appendix A)

Mode	Total commuter miles							
	Boston		Detroit		Los Angeles-Long Beach		Washington, D.C.	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total ¹	8,441	100	15,551	100	27,005	100	12,468	100
Automobile or truck ²	6,524	77	14,471	93	25,196	93	10,673	86
Drives alone.....	4,669	55	11,737	75	19,853	74	6,860	55
Carpool.....	1,799	21	2,609	17	5,274	20	3,734	30
Public transportation ³	1,379	16	496	3	1,233	5	1,548	12
Bus or streetcar.....	619	7	466	3	1,230	5	1,474	12
Subway or elevated.....	585	7	-	-	-	-	24	-
Railroad.....	166	2	23	-	-	-	47	-
Other means ⁴	136	2	103	1	319	1	115	1
Not reported.....	404	5	483	3	261	1	127	1

¹Excludes workers with no fixed place of work, workers who worked at home, and workers who did not report distance to work.

²Includes workers using an auto or truck but not specifying type of riding arrangement.

³Includes workers using taxicabs.

⁴Bicycle, motorcycle, walks only all other other means not listed.

ington, D.C. SMSA where 30 percent of all commuter miles were due to carpools.

The differences in the proportion of the total distance traveled due to public transit are, of course, related to the availability of such transportation. These differences are similar to those noted above for carpooling. Public transportation accounted for the smallest proportion of total commuter mileage in the Detroit SMSA (3 percent), followed by the Los Angeles-Long Beach SMSA where only 5 percent of the total distance traveled to work was due to workers who used transit. However, unlike the figures for carpools, where Washington, D.C. led the way, the area with the highest proportion of total commuter miles by mass transit was Boston, with 16 percent, while in Washington, D.C., the comparable figure was 12 percent.

Trip duration. The median travel time to work among the 20 surveyed SMSA's was 20.3 minutes in 1977 (table K). Not surprisingly, work trips made by carpool typically took more time to complete than trips of workers who drove alone, although the difference was not large (22.3 minutes versus 19.7 minutes). Comparing types of carpooling arrangements, workers who shared driving typically had trips of the longest duration (about 26.2 minutes), followed by workers who drove others (23 minutes), with the shortest trips being made by workers who always rode as passengers with someone else (approximately 18.5 minutes). These differences in median travel time among workers in carpools reflect the differences

in median distance to work noted in table H and discussed previously.

Workers whose major mode of transportation was public transit typically spent much longer getting to work than workers who traveled in an auto or truck. The median travel time to work by public transportation was 32.8 minutes, compared with 20.2 minutes for people in the surveyed SMSA's whose major mode was auto or truck (table K).

Among the different types of public transportation, median travel time for workers riding a bus or streetcar was about the same as that for persons using the subway or elevated (roughly 33 minutes). However, these two medians were significantly longer in duration than the median auto or truck trip (20.3 minutes), in spite of the fact that the auto or truck trips covered a slightly greater distance than those made by public transit. (See table H.)

Trips of the longest duration, much longer than any other means of transportation, were experienced by workers who rode a commuter railroad to work (55.8 minutes). At the other end of the distribution, the shortest duration trips were taken by people who walked the entire way to work (9.3 minutes), while people using other means (e.g., bicycles

Table K. Median Time Taken to Get to Work, by Major Mode of Transportation, for 20 SMSA's: 1977

Mode	Time taken (minutes)	
	Median	Standard error
Total ¹	20.3	0.1
Workers using vehicles.....	20.8	0.1
Auto.....	20.2	0.1
Truck.....	20.3	0.3
Auto or truck ²	20.2	0.1
Drives alone.....	19.7	0.1
Carpool.....	22.3	0.2
Shares driving.....	26.2	0.4
Drives others.....	23.0	0.4
Rides with someone.....	18.5	0.3
Public transportation ³	32.8	0.4
Bus or streetcar.....	32.5	0.5
Subway or elevated.....	33.2	0.9
Railroad.....	55.8	3.9
Other means ⁴	14.9	0.5
Walks only.....	9.3	0.3
Not reported.....	19.2	0.5

¹Excludes workers with no fixed place of work, workers who worked at home, and workers who did not report travel time to work.

²Includes workers using an auto or truck but not specifying type of riding arrangement.

³Includes workers using taxicabs.

⁴Bicycle, motorcycle, and all other means not listed.

Table L. Median Time Taken to Get to Work, for 20 SMSA's and SMSA Transportation Groups: 1977

(Numbers in thousands. SMSA's as of the 1970 census. For explanation of transportation groups, see appendix A)

SMSA's and SMSA groups	Total ¹	Time taken (minutes)	
		Median	Standard error
Total, 20 SMSA's....	12,032	20.3	0.1
Group A.....	1,564	20.6	0.3
Boston.....	958	20.5	0.3
Newark.....	606	20.7	0.5
Group B.....	6,678	21.1	0.1
Anaheim-Santa Ana-Garden Grove.....	719	20.4	0.4
Detroit.....	1,459	21.2	0.2
Los Angeles-Long Beach..	2,574	20.2	0.3
Pittsburgh.....	757	19.4	0.5
Washington, D.C.....	1,168	24.9	0.3
Group C-North.....	1,021	18.8	0.3
Albany-Schenectady-Troy..	267	18.2	0.4
Minneapolis-St. Paul....	754	19.0	0.4
Group C-South and West....	1,424	19.9	0.2
Dallas.....	684	20.7	0.4
Fort Worth.....	331	18.7	0.4
Memphis.....	284	19.6	0.4
Tacoma.....	125	19.4	0.4
Group D.....	1,346	18.3	0.1
Madison.....	129	16.6	0.3
Orlando.....	191	18.8	0.4
Phoenix.....	440	19.2	0.4
Saginaw.....	76	15.8	0.4
Salt Lake City.....	239	18.7	0.3
Spokane.....	107	16.8	0.4
Wichita.....	164	17.8	0.3

¹Excludes workers with no fixed place of work, workers who worked at home, and workers who did not report travel time to work.

or motorcycles) typically spent about 15 minutes getting to work (table K).

Table L presents the median time taken to get to work in 1977 for each of the 20 metropolitan areas surveyed. Median travel time was greatest in the Washington, D.C. SMSA, with the typical commute lasting about 25 minutes. Workers in the Saginaw SMSA, however, had one of the shortest commuting times (15.8 minutes), although their median trip was not significantly shorter than that of workers in the Madison (16.6 minutes) or Spokane (16.8 minutes) SMSA's.

BACKGROUND AND STRUCTURE OF THE SURVEY

The Annual Housing Survey. The Annual Housing Survey consists of a national sample of approximately 75,000 households, and a metropolitan area sample of about 140,000 households spread over 20 SMSA's (for operational reasons, the 1975-76 enumeration covered 21 areas). These SMSA's comprise one-third of a list of 60 SMSA's arranged in a 3-year cycle, so that, in all, about 420,000 metropolitan housing units are surveyed in a 3-year period. (See List of SMSA's by Survey Group.) Each of the three survey groups of SMSA's contains four very large SMSA's, with approximately 15,000 sample housing units equally divided between the central city and the SMSA balance. The remaining SMSA's each contain about 5,000 sample housing units distributed in proportion to the actual distribution of hous-

ing units between the central city and the SMSA balance. The survey coverage relates to each SMSA as defined for the 1970 census.

The Travel-to-Work Supplement was first included for the Group II SMSA sample, the field enumeration of which ran from April 1975 through March 1976. It was also used in the 1975 Annual Housing Survey national sample which was completed in the late fall of that year. The Madison SMSA was included in Group II for the first enumeration, rather than in Group I, resulting in coverage of 21 metropolitan areas. Coverage of another 20 SMSA's (Group III) was undertaken from April 1976 through March 1977, and interviewing in the final 20 SMSA's (Group I repeated), including Madison again, was completed during the period of April 1977 through March 1978. A facsimile of the Travel-to-Work Supplement can be found in appendix C.

Related travel-to-work data. In addition to this report, several other data products are or will be available from each of the three SMSA survey groups covered by the Travel-to-Work Supplement. These products include other published reports, unpublished tables, microdata tapes, and summary tapes of census tract-to-census tract commuter flows for each SMSA. Data for the SMSA's in Survey Group II are currently available in all forms. Data for the SMSA's in Survey Group III are presently available in Current Population Reports, Series P-23, No. 72, *Selected Characteristics of Travel to*

List of SMSA's by Survey Group

SURVEY GROUP I (1977 to 1978)	SURVEY GROUP II (1975 to 1976)	SURVEY GROUP III (1976 to 1977)
Albany-Schenectady-Troy, N.Y.	Atlanta, Ga.*	Allentown-Bethlehem-Easton, Pa.-N.J.
Anaheim-Santa Ana-Garden Grove, Calif.	Chicago, Ill.*	Baltimore, Md.
Boston, Mass.*	Cincinnati, Ohio-Ky.-Ind.	Birmingham, Ala.
Dallas, Tex.	Colorado Springs, Colo.	Buffalo, N.Y.
Detroit, Mich.*	Columbus, Ohio	Cleveland, Ohio
Fort Worth, Tex.	Hartford, Conn.	Denver, Colo.
Los Angeles-Long Beach, Calif.*	Kansas City, Mo.-Kans.	Grand Rapids, Mich.
Madison, Wis.†	Miami, Fla.	Honolulu, Hawaii
Memphis, Tenn.-Ark.	Milwaukee, Wis.	Houston, Tex.*
Minneapolis-St. Paul, Minn.	New Orleans, La.	Indianapolis, Ind.
Newark, N.J.	Newport News-Hampton, Va.	Las Vegas, Nev.
Orlando, Fla.	Paterson-Clifton-Passaic, N.J.	Louisville, Ky.-Ind.
Phoenix, Ariz.	Philadelphia, Pa.-N.J.*	New York, N.Y.*
Pittsburgh, Pa.	Portland, Oreg.-Wash.	Oklahoma City, Okla.
Saginaw, Mich.	Rochester, N.Y.	Omaha, Nebr.-Iowa
Salt Lake City, Utah	San Antonio, Tex.	Providence-Pawtucket-Warwick, R.I.-Mass.
Spokane, Wash.	San Bernardino-Riverside-Ontario, Calif.	Raleigh, N.C.
Tacoma, Wash.	San Diego, Calif.	Sacramento, Calif.
Washington, D.C.-Md.-Va.*	San Francisco-Oakland, Calif.*	St. Louis, Mo.-Ill.*
Wichita, Kans.	Springfield-Chicopee-Holyoke, Mass.-Conn.	Seattle-Everett, Wash.*

*Sample size of 15,000 housing units; all others are 5,000 housing units.

†Included with Group II for the first (1975-76) enumeration.

Work in 20 Metropolitan Areas: 1976, and on computer tape as summaries of census tract-to-census tract commuter flows.

Data from the 1975 National Travel-to-Work Supplement are currently available in Current Population Reports, Series P-23, No. 99, *The Journey to Work in the United States: 1975*, in microdata form on computer tapes, and in the form of unpublished tables. As in the SMSA samples, the unpublished National tables cross-classify commuters and characteristics of the commuting trip by the socioeconomic characteristics obtainable from the Annual Housing Survey, which include age, sex, race, household relationship, and earnings. Information concerning these unpublished data may be obtained by writing to the Chief, Population Division, U.S. Bureau of the Census, Washington, D.C. 20233.

Comparability with 1970 census data. Care must be taken in comparing data on major mode of transportation from the Travel-to-Work Supplement with 1970 census data on the same topic. Whereas the census asked workers to specify the principal means of transportation they used to get to work on the last day of the reference week prior to the Census date (April 1, 1970), the Travel-to-Work Supplement asks respondents to specify their usual mode of transportation to work, regardless of any possible deviation from that pattern which may have occurred during the week prior to interview.

The Travel-to-Work Supplement and the 1970 census are also based on different universes. While the 1970 census

refers to the entire population, the Travel-to-Work Supplement is based on the population in households (including the military population in households) and excludes persons living in group quarters such as college dormitories and military barracks. Since it is believed that workers who live in group quarters typically exhibit a high rate of walking to work, comparisons of percentage distributions of mode use in 1970 and 1977 in this report are made on the basis of workers using vehicles, rather than on a worker total. To the extent that workers living in group quarters have a higher rate of use of certain types of vehicles than workers living in households, their exclusion from the survey universe may result in an underestimate of the use of those modes in the total sample. This may be particularly true for public transportation, thereby affecting the percentage point differences in the use of public transportation between 1970 and 1977 reported in table E.

Because only persons who were actually working are included in the survey, 1970-77 comparisons of worker totals are affected not only by the inclusion of group quarters residents in 1970, but also by the increase in unemployment in nearly all SMSA's between 1970 and 1977. For these reasons, it is probably more valid to compare the proportion of workers using a particular mode in 1977 with the corresponding proportion in 1970, rather than the 1970-77 numeric change. There are also basic differences between the Travel-to-Work Supplement and the 1970 census in terms of interviewing procedures which can affect comparability.

Table 1. Major Mode of Transportation to Work, for 20 SMSA's and SMSA Transportation Groups: 1977

(Numbers in thousands. SMSA's as of the 1970 census. For explanation of transportation groups and meaning of symbols, see appendix A)

Mode	Total, 20 SMSA's		Total, Group A		Boston		Newark		Total, Group B	
	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹
All workers.....	13,658	(X)	1,774	(X)	1,080	(X)	694	(X)	7,558	(X)
Workers using vehicles.....	12,544	100	1,531	100	930	100	601	100	6,982	100
Auto.....	10,247	82	1,204	79	704	76	500	83	5,810	83
Truck.....	1,168	9	53	3	31	3	23	4	564	8
Auto or truck ²	11,415	91	1,257	82	735	79	522	87	6,374	91
Drives alone.....	9,062	72	968	63	551	59	417	69	5,088	73
Carpool.....	2,266	18	271	18	176	19	95	16	1,241	18
Shares driving.....	875	7	81	5	47	5	34	6	510	7
Drives others.....	520	4	74	5	52	6	22	4	270	4
Rides with someone.....	872	7	115	8	76	8	39	6	460	7
Public transportation ³	921	7	253	17	178	19	75	13	496	7
Bus or streetcar.....	790	6	141	9	89	10	52	9	480	7
Subway or elevated.....	83	1	78	5	75	8	3	-	5	-
Railroad.....	32	-	30	2	11	1	19	3	3	-
Other means ⁴	207	2	21	1	17	2	3	1	112	2
Bicycle.....	98	1	12	1	10	1	2	-	50	1
Walks only.....	518	[4]	113	[6]	76	[7]	38	[5]	266	[4]
Works at home.....	227	[2]	26	[1]	18	[2]	9	[1]	115	[2]
Not reported.....	370	[3]	104	[6]	57	[5]	47	[7]	196	[3]
Mode	Anaheim-Santa Ana-Garden Grove		Detroit		Los Angeles-Long Beach		Pittsburgh		Washington, D.C.	
	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹
All workers.....	843	(X)	1,617	(X)	2,934	(X)	856	(X)	1,308	(X)
Workers using vehicles.....	806	100	1,500	100	2,753	100	716	100	1,206	100
Auto.....	684	85	1,320	88	2,286	83	561	78	960	80
Truck.....	86	11	101	7	268	10	56	8	53	4
Auto or truck ²	770	95	1,421	95	2,554	93	617	86	1,013	84
Drives alone.....	640	79	1,172	78	2,090	76	486	68	702	58
Carpool.....	128	16	235	16	452	16	124	17	302	25
Shares driving.....	65	8	100	7	153	6	54	8	138	11
Drives others.....	26	3	54	4	99	4	26	4	66	5
Rides with someone.....	37	5	82	5	201	7	44	6	97	8
Public transportation ³	15	2	63	4	145	5	94	13	178	15
Bus or streetcar.....	15	2	60	4	144	5	92	13	169	14
Subway or elevated.....	-	-	-	-	-	-	-	-	5	-
Railroad.....	-	-	1	-	-	-	1	-	2	-
Other means ⁴	21	3	16	1	53	2	5	1	15	1
Bicycle.....	11	1	7	-	24	1	1	-	7	1
Walks only.....	16	[2]	45	[3]	89	[3]	57	[7]	59	[4]
Works at home.....	15	[2]	10	[1]	54	[2]	11	[1]	26	[2]
Not reported.....	6	[1]	63	[4]	39	[1]	71	[8]	17	[1]
Mode	Total, Group C-North		Albany-Schenectady-Troy		Minneapolis-St. Paul		Total, Group C-South and West		Dallas	
	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹
All workers.....	1,163	(X)	300	(X)	862	(X)	1,621	(X)	788	(X)
Workers using vehicles.....	1,059	100	270	100	789	100	1,523	100	730	100
Auto.....	875	83	232	86	643	82	1,221	80	582	80
Truck.....	77	7	21	8	56	7	241	16	119	16
Auto or truck ²	952	90	253	93	700	89	1,462	96	700	96
Drives alone.....	743	70	188	70	555	70	1,166	77	565	77
Carpool.....	205	19	62	23	143	18	285	19	128	18
Shares driving.....	74	7	23	8	51	6	110	7	52	7
Drives others.....	47	4	12	5	35	4	69	5	32	4
Rides with someone.....	84	8	27	10	57	7	106	7	44	6
Public transportation ³	85	8	15	6	70	9	45	3	22	3
Bus or streetcar.....	84	8	14	5	70	9	44	3	22	3
Subway or elevated.....	-	-	-	-	-	-	-	-	-	-
Railroad.....	-	-	-	-	-	-	-	-	-	-
Other means ⁴	22	2	3	1	19	2	16	1	7	1
Bicycle.....	14	1	1	-	13	2	5	-	3	-
Walks only.....	56	[5]	20	[7]	36	[4]	35	[2]	17	[2]
Works at home.....	31	[3]	6	[2]	25	[3]	20	[1]	9	[1]
Not reported.....	17	[1]	4	[1]	12	[1]	43	[3]	32	[4]

See footnotes at end of table.

Table 1. Major Mode of Transportation to Work, for 20 SMSA's and SMSA Transportation Groups: 1977—Continued
 (Numbers in thousands. SMSA's as of the 1970 census. For explanation of transportation groups and meaning of symbols, see appendix A)

Mode	Fort Worth		Memphis		Tacoma		Total, Group D		Madison	
	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹
All workers.....	374	(X)	320	(X)	139	(X)	1,543	(X)	150	(X)
Workers using vehicles.....	359	100	303	100	132	100	1,449	100	133	100
Auto.....	292	81	244	81	104	79	1,137	78	103	77
Truck.....	57	16	44	14	22	17	233	16	10	8
Auto or truck ²	348	97	288	95	126	96	1,369	94	113	85
Drives alone.....	275	77	224	74	101	77	1,097	76	89	66
Carpool.....	70	20	62	21	24	18	265	18	24	18
Shares driving.....	27	8	21	7	10	7	99	7	8	6
Drives others.....	16	4	15	5	6	4	59	4	6	5
Rides with someone.....	27	7	26	9	9	7	107	7	10	7
Public transportation ³	6	2	14	5	3	2	42	3	12	9
Bus or streetcar.....	6	2	13	4	3	2	42	3	11	9
Subway or elevated.....	-	-	-	-	-	-	-	-	-	-
Railroad.....	-	-	-	-	-	-	-	-	-	-
Other means ⁴	4	1	2	-	3	2	38	3	8	6
Bicycle.....	1	-	-	-	1	1	18	1	6	5
Walks only.....	7	[2]	7	[2]	4	[3]	48	[3]	10	[7]
Works at home.....	5	[1]	4	[1]	2	[1]	34	[2]	5	[3]
Not reported.....	3	[1]	7	[2]	2	[1]	11	[1]	2	[1]

Mode	Orlando		Phoenix		Saginaw		Salt Lake City		Spokane		Wichita	
	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹
All workers.....	222	(X)	504	(X)	84	(X)	277	(X)	122	(X)	183	(X)
Workers using vehicles.....	211	100	478	100	79	100	259	100	114	100	175	100
Auto.....	176	83	367	77	67	85	195	75	88	77	141	80
Truck.....	26	12	94	20	11	14	43	17	20	17	29	17
Auto or truck ²	202	96	461	96	78	99	238	92	108	94	170	97
Drives alone.....	162	76	376	79	65	82	183	71	87	76	136	78
Carpool.....	39	19	82	17	12	16	54	21	20	18	34	19
Shares driving.....	12	5	27	6	6	8	26	10	9	8	12	7
Drives others.....	10	5	18	4	2	3	11	4	4	4	8	5
Rides with someone.....	18	8	37	8	4	5	18	7	7	6	13	8
Public transportation ³	4	2	4	1	-	-	16	6	4	4	3	2
Bus or streetcar.....	4	2	4	1	-	-	16	6	4	4	3	2
Subway or elevated.....	-	-	-	-	-	-	-	-	-	-	-	-
Railroad.....	-	-	-	-	-	-	-	-	-	-	-	-
Other means ⁴	5	3	14	3	1	1	5	2	2	2	2	1
Bicycle.....	2	1	6	1	-	1	1	1	1	1	1	-
Walks only.....	6	[3]	12	[2]	2	[2]	10	[3]	4	[3]	4	[2]
Works at home.....	3	[1]	11	[2]	2	[2]	7	[3]	3	[2]	4	[2]
Not reported.....	2	[1]	3	[1]	1	[1]	2	[1]	1	[1]	1	[1]

¹Percents are of workers using vehicles, except percents in brackets [], which are of all workers.

²Includes workers using an auto or truck but not specifying type of riding arrangement.

³Includes workers using taxicabs.

⁴Includes workers using motorcycles and all other means not listed.

Table 2. Median Distance From Home to Work, by Major Mode of Transportation, for 20 SMSA's and SMSA Transportation Groups: 1977

(Medians and standard errors in miles. SMSA's as of the 1970 census. For explanation of transportation groups and meaning of symbols, see appendix A)

Median distance by mode	Total, 20 SMSA'S		Total, Group A		Boston		Newark		Total, Group B	
	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error
All workers ¹	7.7	0.1	6.3	0.2	6.1	0.2	6.6	0.3	8.1	0.1
Workers using vehicles.....	8.2	0.1	7.2	0.2	7.0	0.2	7.4	0.3	8.6	0.1
Auto.....	8.3	0.1	7.3	0.2	7.3	0.2	7.2	0.3	8.8	0.1
Truck.....	9.3	0.2	8.0	1.1	8.4	1.3	7.5	1.8	9.3	0.4
Auto or truck ²	8.4	0.1	7.3	0.2	7.3	0.2	7.2	0.3	8.8	0.1
Drives alone.....	8.2	0.1	7.1	0.2	7.1	0.3	7.1	0.4	8.5	0.1
Carpool.....	9.4	0.2	8.1	0.4	8.2	0.4	7.8	0.7	10.1	0.3
Shares driving.....	12.6	0.3	11.9	1.1	13.3	1.6	10.8	1.4	13.2	0.4
Drives others.....	9.3	0.3	8.0	0.6	9.1	0.7	5.9	1.1	9.8	0.5
Rides with someone.....	6.5	0.2	5.5	0.6	5.0	0.5	6.5	1.5	6.9	0.4
Public transportation ³	6.9	0.2	7.1	0.4	6.6	0.3	9.6	1.7	7.0	0.3
Bus or streetcar.....	6.7	0.2	5.4	0.5	5.0	0.3	6.5	1.5	7.0	0.3
Subway or elevated.....	7.1	0.5	7.3	0.5	7.5	0.4	4.0	0.6	4.5	0.8
Railroad.....	20.9	1.4	20.5	1.4	16.5	1.5	24.5	3.7	24.1	7.6
Other means ⁴	3.5	0.2	2.9	0.4	3.0	0.4	2.0	17.1	3.6	0.3
Walks only.....	0.6	0.1	0.7	0.1	0.7	0.1	0.7	0.1	0.6	0.1
Not reported.....	6.6	0.4	6.0	0.6	6.0	0.6	6.0	1.0	6.9	0.6
Median distance by mode	Anaheim-Santa Ana-Garden Grove		Detroit		Los Angeles-Long Beach		Pittsburgh		Washington, D.C.	
	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error
All workers ¹	10.0	0.3	8.6	0.2	8.0	0.2	5.6	0.3	8.4	0.1
Workers using vehicles.....	10.3	0.3	9.0	0.2	8.3	0.2	6.3	0.3	8.9	0.1
Auto.....	10.4	0.4	8.9	0.2	8.6	0.2	6.3	0.3	9.2	0.2
Truck.....	11.3	0.8	11.2	0.8	8.0	0.6	8.6	1.4	11.2	1.0
Auto or truck ²	10.5	0.3	9.1	0.2	8.5	0.2	6.5	0.3	9.3	0.2
Drives alone.....	10.2	0.4	8.9	0.2	8.4	0.2	6.2	0.4	8.7	0.2
Carpool.....	12.1	0.8	9.7	0.4	9.7	0.6	7.7	0.8	11.1	0.4
Shares driving.....	15.4	1.5	12.5	0.8	13.6	1.0	10.6	1.5	13.2	0.5
Drives others.....	10.0	1.4	9.6	0.9	10.8	1.2	7.9	1.4	9.7	0.7
Rides with someone.....	8.6	1.4	6.9	0.7	6.3	0.9	4.3	0.5	8.6	0.5
Public transportation ³	10.1	2.2	7.5	0.8	7.1	0.7	5.9	0.7	7.1	0.3
Bus or streetcar.....	10.1	2.2	7.5	0.8	7.2	0.7	5.7	0.7	7.3	0.3
Subway or elevated.....	-	-	-	-	-	-	-	-	4.5	0.5
Railroad.....	-	-	(B)	(X)	-	-	(B)	(X)	29.0	9.0
Other means ⁴	3.3	0.9	3.3	1.2	3.6	0.4	1.1	0.6	4.3	0.5
Walks only.....	0.6	0.1	0.6	0.1	0.6	0.1	0.6	0.1	0.7	0.1
Not reported.....	4.9	4.3	6.9	1.0	7.8	1.4	6.5	0.9	7.0	1.9
Median distance by mode	Total, Group C-North		Albany-Schenectady-Troy		Minneapolis-St. Paul		Total, Group C-South and West		Dallas	
	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error
All workers ¹	7.1	0.2	6.1	0.3	7.4	0.3	8.7	0.1	9.2	0.3
Workers using vehicles.....	7.7	0.2	6.9	0.3	8.0	0.3	9.0	0.1	9.6	0.3
Auto.....	8.0	0.2	7.3	0.3	8.3	0.3	8.8	0.2	9.4	0.3
Truck.....	9.4	1.1	7.3	1.5	10.3	1.4	10.3	0.4	10.8	0.8
Auto or truck ²	8.1	0.2	7.3	0.3	8.4	0.3	9.0	0.2	9.6	0.3
Drives alone.....	8.0	0.2	7.3	0.3	8.3	0.3	8.8	0.2	9.4	0.3
Carpool.....	8.2	0.4	7.3	0.6	8.6	0.6	9.9	0.4	10.8	0.9
Shares driving.....	11.1	0.8	10.7	0.9	11.3	1.3	12.4	0.6	12.5	1.3
Drives others.....	8.2	1.0	6.9	1.1	8.9	1.4	10.3	0.8	11.1	1.9
Rides with someone.....	6.2	0.6	5.0	0.6	6.7	0.8	7.3	0.5	8.7	1.1
Public transportation ³	5.7	0.5	4.1	0.2	6.5	0.6	8.3	0.8	9.4	1.4
Bus or streetcar.....	5.9	0.5	4.1	0.2	6.6	0.6	8.4	0.8	9.4	1.4
Subway or elevated.....	-	-	-	-	-	-	-	-	-	-
Railroad.....	-	-	-	-	-	-	-	-	-	-
Other means ⁴	3.0	0.5	1.6	1.3	3.2	0.6	3.6	0.7	2.3	0.6
Walks only.....	0.6	0.1	0.6	0.1	0.6	0.1	0.6	0.1	0.6	0.1
Not reported.....	4.8	1.0	4.7	1.8	4.9	1.3	7.2	0.9	7.6	1.3

See footnotes at end of table.

Table 2. Median Distance From Home to Work, by Major Mode of Transportation, for 20 SMSA's and SMSA Transportation Groups: 1977—Continued

Medians and standard errors in miles. SMSA's as of the 1970 census. For explanation of transportation groups and meaning of symbols, see appendix A)

Median distance by mode	Fort Worth		Memphis		Tacoma		Total, Group D		Madison	
	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error
All workers ¹	8.6	0.3	7.8	0.3	8.4	0.3	6.9	0.1	4.8	0.1
Workers using vehicles.....	8.9	0.3	8.1	0.3	8.6	0.3	7.2	0.1	5.3	0.2
Auto.....	8.6	0.3	8.0	0.3	8.5	0.3	7.1	0.1	5.8	0.2
Truck.....	10.5	1.0	9.3	0.9	9.6	0.8	8.7	0.2	7.5	1.2
Auto or truck ²	8.9	0.3	8.2	0.3	8.7	0.3	7.4	0.1	5.9	0.2
Drives alone.....	8.7	0.3	8.1	0.3	8.3	0.3	7.1	0.1	5.7	0.3
Carpool.....	9.7	0.7	8.2	0.7	11.7	1.3	8.6	0.2	6.7	0.7
Shares driving.....	13.2	1.1	9.9	1.1	18.5	2.1	11.8	0.4	9.6	1.0
Drives others.....	9.7	1.4	10.4	1.0	8.6	1.6	9.0	0.5	6.8	1.2
Rides with someone.....	6.7	0.9	5.3	0.9	7.8	1.0	5.6	0.4	4.6	0.3
Public transportation ³	9.5	1.7	6.2	1.2	5.3	1.6	5.6	0.6	4.5	0.2
Bus or streetcar.....	9.7	1.8	6.5	1.3	5.3	1.6	5.7	0.6	4.5	0.2
Subway or elevated.....	-	-	-	-	-	-	-	-	-	-
Railroad.....	-	-	-	-	-	-	-	-	-	-
Other means ⁴	3.8	1.2	(B)	(X)	7.0	2.7	3.9	0.3	3.2	0.3
Walks only.....	0.5	0.1	0.7	0.1	0.6	0.1	0.6	0.1	0.6	0.1
Not reported.....	8.4	5.5	4.3	1.5	10.4	2.6	7.9	1.1	6.2	2.2

Median distance by mode	Orlando		Phoenix		Saginaw		Salt Lake City		Spokane		Wichita	
	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error
All workers ¹	7.6	0.3	7.7	0.3	5.8	0.3	7.4	0.2	5.8	0.3	6.4	0.2
Workers using vehicles.....	7.9	0.3	8.0	0.3	6.1	0.3	7.8	0.2	6.1	0.3	6.5	0.2
Auto.....	7.9	0.3	7.9	0.3	5.7	0.3	7.5	0.3	6.0	0.3	6.4	0.2
Truck.....	9.0	0.9	9.0	0.5	9.0	0.8	9.0	0.6	7.5	0.7	8.0	0.6
Auto or truck ²	8.0	0.3	8.1	0.3	6.1	0.3	7.8	0.3	6.3	0.3	6.6	0.2
Drives alone.....	7.8	0.3	7.9	0.3	6.0	0.3	7.4	0.3	6.1	0.3	6.1	0.2
Carpool.....	9.0	0.6	9.2	0.7	6.8	1.0	9.3	0.7	7.1	0.6	8.7	0.4
Shares driving.....	13.7	2.2	12.6	1.1	12.6	1.5	12.4	0.7	8.7	1.0	10.6	0.8
Drives others.....	9.6	1.2	10.4	1.7	7.2	1.6	8.0	1.3	9.0	1.5	9.0	0.9
Rides with someone.....	6.9	0.9	5.8	1.0	3.5	0.4	4.8	0.6	4.9	0.6	7.1	0.6
Public transportation ³	4.8	1.3	8.4	3.0	(B)	(X)	8.9	1.1	4.1	0.4	4.4	0.5
Bus or streetcar.....	4.9	1.4	8.4	3.0	(B)	(X)	8.9	1.1	4.1	0.4	4.5	0.5
Subway or elevated.....	-	-	-	-	-	-	-	-	-	-	-	-
Railroad.....	-	-	-	-	-	-	-	-	-	-	-	-
Other means ⁴	4.8	1.5	4.2	1.1	(B)	(X)	4.6	1.3	4.4	0.9	2.3	0.6
Walks only.....	0.7	0.1	0.6	0.1	0.6	0.1	0.6	0.1	0.7	0.1	0.6	0.1
Not reported.....	(B)	(X)	11.3	3.7	(B)	(X)	(B)	(X)	9.9	2.1	(B)	(X)

¹Excludes workers with no fixed place of work, workers who worked at home, and workers who did not report distance to work.

²Includes workers using an auto or truck but not specifying type of riding arrangement.

³Includes workers using taxicabs.

⁴Bicycle, motorcycle, and all other means not listed.

Table 3. Median Time Taken to Get to Work, by Major Mode of Transportation, for 20 SMSA's and SMSA Transportation Groups: 1977

(Medians and standard errors in minutes. SMSA's as of the 1970 census. For explanation of transportation groups and meaning of symbols, see appendix A)

Median time by mode	Total, 20 SMSA's		Total, Group A		Boston		Newark		Total, Group B	
	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error
All workers ¹	20.3	0.1	20.6	0.3	20.5	0.3	20.7	0.5	21.1	0.1
Workers using vehicles.....	20.8	0.1	21.6	0.3	21.8	0.3	21.4	0.5	21.6	0.1
Auto.....	20.2	0.1	19.8	0.3	19.6	0.3	20.2	0.5	21.0	0.1
Truck.....	20.3	0.3	20.0	1.4	19.9	1.6	20.1	2.7	20.7	0.5
Auto or truck ²	20.2	0.1	19.9	0.3	19.6	0.3	20.2	0.5	21.0	0.1
Drives alone.....	19.7	0.1	19.4	0.3	19.0	0.4	19.9	0.6	20.4	0.2
Carpool.....	22.3	0.2	21.7	0.6	21.7	0.7	21.6	1.1	23.6	0.3
Shares driving.....	26.2	0.4	27.4	1.3	28.8	1.5	25.5	2.2	27.9	0.7
Drives others.....	23.0	0.4	23.1	1.0	24.0	1.2	21.6	1.7	23.7	0.7
Rides with someone.....	18.5	0.3	16.8	1.0	16.4	1.0	17.8	2.1	19.7	0.5
Public transportation ³	32.8	0.4	32.7	0.7	31.9	0.6	36.6	3.4	34.9	0.8
Bus or streetcar.....	32.5	0.5	30.4	1.0	29.8	1.0	31.7	2.4	35.1	0.8
Subway or elevated.....	33.2	0.9	33.4	0.9	33.5	0.8	31.7	6.1	31.1	3.4
Railroad.....	55.8	3.9	54.9	3.9	43.9	3.8	64.8	6.4	61.6	9.4
Other means ⁴	14.9	0.5	16.4	2.0	16.4	1.7	35.1	16.4	14.3	0.6
Walks only.....	9.3	0.3	10.5	0.5	10.2	0.5	11.4	1.5	9.7	0.4
Not reported.....	19.2	0.5	18.4	0.9	17.1	1.2	19.7	1.5	20.0	0.9
Median time by mode	Anaheim-Santa Ana-Garden Grove		Detroit		Los Angeles-Long Beach		Pittsburgh		Washington, D.C.	
	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error
All workers ¹	20.4	0.4	21.2	0.2	20.2	0.3	19.4	0.5	24.9	0.3
Workers using vehicles.....	20.6	0.4	21.6	0.3	20.5	0.3	20.3	0.5	25.8	0.3
Auto.....	20.5	0.4	21.2	0.3	20.3	0.3	18.8	0.5	24.2	0.3
Truck.....	21.3	1.1	23.3	1.0	19.0	1.0	20.4	2.3	22.9	1.2
Auto or truck ²	20.5	0.4	21.3	0.3	20.2	0.3	18.9	0.5	24.2	0.3
Drives alone.....	20.2	0.4	21.0	0.3	19.9	0.3	18.1	0.6	22.6	0.3
Carpool.....	22.3	0.9	22.7	0.7	21.9	0.7	21.8	1.1	28.4	0.6
Shares driving.....	25.3	1.6	26.6	1.3	27.2	1.6	24.7	2.5	31.3	0.9
Drives others.....	21.1	1.7	22.9	1.2	23.2	1.6	21.4	2.0	27.6	1.0
Rides with someone.....	19.1	1.6	18.5	1.1	18.2	1.0	17.6	2.2	24.5	1.0
Public transportation ³	44.1	5.0	35.8	2.2	32.6	1.8	33.7	1.9	36.4	1.1
Bus or streetcar.....	44.1	5.0	36.3	2.2	32.8	1.8	33.5	1.9	36.9	1.1
Subway or elevated.....	-	-	-	-	-	-	-	-	31.1	2.6
Railroad.....	-	-	(B)	(X)	-	-	(B)	(X)	57.3	5.2
Other means ⁴	13.9	2.2	15.4	2.1	13.8	0.9	12.5	1.1	18.9	2.2
Walks only.....	7.6	1.3	8.2	0.8	9.8	0.9	9.5	1.0	12.1	0.7
Not reported.....	24.3	9.9	20.3	1.3	18.4	2.3	20.0	1.6	22.0	2.0
Median time by mode	Total, Group C-North		Albany-Schenectady-Troy		Minneapolis-St. Paul		Total, Group C-South and West		Dallas	
	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error
All workers ¹	18.8	0.3	18.2	0.4	19.0	0.4	19.9	0.2	20.7	0.4
Workers using vehicles.....	19.3	0.3	18.9	0.4	19.5	0.4	20.2	0.2	21.1	0.4
Auto.....	18.7	0.3	18.6	0.4	18.7	0.4	19.8	0.2	20.8	0.4
Truck.....	19.0	1.1	17.9	1.7	19.4	1.5	20.8	0.5	21.2	1.0
Auto or truck ²	18.7	0.3	18.6	0.4	18.8	0.4	20.0	0.2	20.8	0.4
Drives alone.....	18.4	0.3	18.3	0.4	18.4	0.4	19.6	0.2	20.3	0.4
Carpool.....	20.1	0.6	19.0	0.8	20.5	0.9	21.7	0.5	23.6	1.1
Shares driving.....	23.0	1.0	22.1	1.1	23.6	1.6	23.6	0.8	25.3	1.8
Drives others.....	21.2	1.2	19.4	1.8	21.9	1.6	23.9	1.1	26.7	1.8
Rides with someone.....	16.4	1.1	15.3	1.1	16.9	1.5	18.5	0.8	20.5	1.5
Public transportation ³	27.4	1.1	23.8	1.5	28.1	1.3	31.2	1.3	32.1	2.3
Bus or streetcar.....	27.5	1.1	24.6	1.7	28.1	1.3	31.5	1.3	32.1	2.3
Subway or elevated.....	-	-	-	-	-	-	-	-	-	-
Railroad.....	-	-	-	-	-	-	-	-	-	-
Other means ⁴	17.0	1.6	9.5	4.9	17.4	1.8	14.5	1.6	14.5	3.5
Walks only.....	8.0	0.7	7.7	0.8	8.1	1.0	8.6	0.8	8.7	1.5
Not reported.....	16.0	2.1	17.5	3.2	15.5	2.8	19.2	1.2	19.6	1.8

See footnotes at end of table.

Table 3. Median Time Taken to Get to Work, by Major Mode of Transportation, for 20 SMSA's and SMSA Transportation Groups: 1977—Continued

(Medians and standard errors in minutes. SMSA's as of the 1970 census. For explanation of transportation groups and meaning of symbols, see appendix A)

Median time by mode	Fort Worth		Memphis		Tacoma		Total, Group D		Madison	
	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error
All workers ¹	18.7	0.4	19.6	0.4	19.4	0.4	18.3	0.1	16.6	0.3
Workers using vehicles.....	18.9	0.4	19.8	0.4	19.7	0.4	18.6	0.1	17.3	0.3
Auto.....	18.6	0.4	19.4	0.4	19.3	0.4	18.2	0.2	16.4	0.4
Truck.....	20.4	1.0	20.1	1.0	21.0	1.1	19.6	0.3	17.7	1.2
Auto or truck ²	18.9	0.4	19.5	0.4	19.6	0.4	18.4	0.1	16.5	0.4
Drives alone.....	18.5	0.4	19.3	0.4	19.0	0.4	18.0	0.2	16.1	0.4
Carpool.....	20.0	0.9	20.1	0.8	22.0	1.0	20.3	0.3	18.1	0.8
Shares driving.....	22.4	1.3	21.2	1.2	29.0	2.3	23.8	0.6	20.9	1.3
Drives others.....	21.6	1.9	23.0	1.7	20.0	1.9	20.9	0.6	19.2	1.4
Rides with someone.....	16.3	1.4	16.9	1.6	18.2	1.5	16.7	0.5	14.8	0.9
Public transportation ³	33.1	4.3	29.7	2.6	24.9	3.6	27.6	1.2	25.3	1.2
Bus or streetcar.....	33.8	4.5	30.7	2.5	24.9	3.6	27.9	1.2	25.6	1.2
Subway or elevated.....	-	-	-	-	-	-	-	-	-	-
Railroad.....	-	-	-	-	-	-	-	-	-	-
Other means ⁴	12.2	1.3	(B)	(X)	20.0	2.8	15.6	0.8	15.7	1.2
Walks only.....	7.7	1.4	9.3	2.4	8.3	1.5	7.6	0.4	8.9	0.8
Not reported.....	18.5	6.1	16.9	2.9	18.9	2.4	18.4	1.5	14.2	2.9

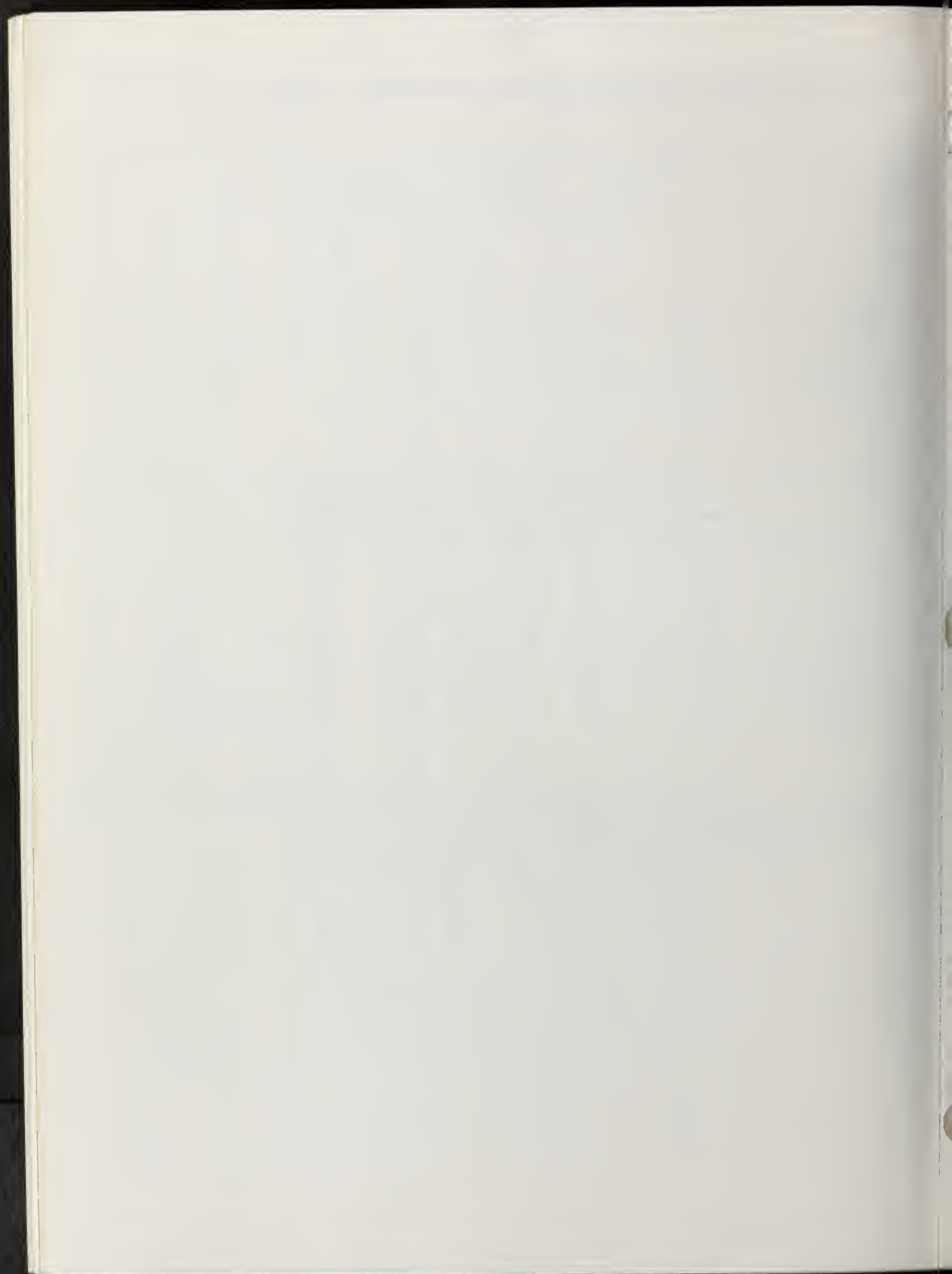
Median time by mode	Orlando		Phoenix		Saginaw		Salt Lake City		Spokane		Wichita	
	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error	Median	Standard error
All workers ¹	18.8	0.4	19.2	0.4	15.8	0.4	18.7	0.3	16.8	0.4	17.8	0.3
Workers using vehicles.....	19.1	0.4	19.5	0.4	16.1	0.4	19.0	0.3	17.0	0.4	18.0	0.3
Auto.....	18.9	0.4	19.3	0.4	15.6	0.4	18.5	0.4	16.6	0.4	17.8	0.3
Truck.....	19.4	1.1	20.6	0.9	20.3	1.2	19.2	0.7	17.9	0.9	18.9	0.8
Auto or truck ²	19.0	0.4	19.6	0.4	16.2	0.4	18.6	0.3	16.8	0.4	18.0	0.3
Drives alone.....	18.4	0.4	19.3	0.4	15.7	0.4	18.0	0.4	16.5	0.4	17.3	0.3
Carpool.....	21.4	1.0	21.0	0.9	18.6	1.1	20.7	0.7	18.0	0.8	20.4	0.7
Shares driving.....	26.5	2.1	26.8	1.8	22.6	1.7	23.8	1.0	19.4	1.4	22.2	1.1
Drives others.....	22.4	2.0	21.5	1.8	19.0	2.2	20.3	1.5	19.4	1.5	21.6	1.4
Rides with someone.....	18.4	1.3	17.2	1.4	13.3	0.9	15.0	1.1	15.3	1.3	18.2	1.1
Public transportation ³	30.2	5.1	33.3	8.3	(B)	(X)	30.9	2.4	22.4	2.1	24.4	3.5
Bus or streetcar.....	31.2	5.0	33.3	8.3	(B)	(X)	30.9	2.4	22.4	2.1	24.9	3.9
Subway or elevated.....	-	-	-	-	-	-	-	-	-	-	-	-
Railroad.....	-	-	-	-	-	-	-	-	-	-	-	-
Other means ⁴	18.6	1.5	14.5	1.8	(B)	(X)	16.6	2.3	15.2	2.1	11.3	2.3
Walks only.....	7.1	1.1	7.1	1.2	6.4	1.1	7.5	1.0	9.4	1.6	6.9	1.2
Not reported.....	(B)	(X)	18.8	2.9	(B)	(X)	(B)	(X)	(B)	(X)	(B)	(X)

¹Excludes workers with no fixed place of work, workers who worked at home, and workers who did not report travel time to work.

²Includes workers using an auto or truck but not specifying type of riding arrangement.

³Includes workers using taxicabs.

⁴Bicycle, motorcycle, and all other means not listed.



Appendix A. Definitions and Explanations

Most of the terms used in this report are self-explanatory or can best be understood by reference to the appropriate questionnaire items. (See appendix C.) An explanation of other subjects is provided below.

Automobile. The category "automobile" includes workers using cars, station wagons, company cars, and passenger vans.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit or a group of unrelated persons sharing a housing unit as partners is also counted as a household.

Means of transportation to work. Means of transportation refers to the principal mode used to get from home to work. Workers who used different means of transportation on different days of the week were asked to specify the one used most often. Workers who used more than one means of transportation to get to work each day were asked to specify the one used for the longest distance during the work trip.

No fixed place of work. Workers with no fixed place of work were those who did not usually work at the same location each day and did not usually report to a central location to begin work each day.

Standard metropolitan statistical area (SMSA). The term SMSA as used in this report refers to the 243 standard metropolitan statistical areas used in the 1970 census. Changes in SMSA definition criteria, boundaries, and titles made after February 1971 are not reflected in the report.

Except in the New England States, a standard metropolitan statistical area was essentially defined in 1970 as a county or group of contiguous counties containing at least one city of 50,000 inhabitants or more (or "twin cities" with a combined population of at least 50,000). Contiguous counties were included in the SMSA definition if, according

to certain criteria, they were socially and economically integrated with the central county. In the New England States, SMSA's consisted of towns and cities instead of counties. Each 1970 census SMSA included at least one central city; the complete title of an SMSA identified the central city or cities.

SMSA transportation groupings. The groupings of SMSA's shown in the tables in this report conform to a Department of Transportation categorization of major SMSA's by transportation characteristics. Transportation Group A, representing the largest metropolitan areas having major public transportation networks, includes the Boston and Newark SMSA's. Transportation Group B, representing very large metropolitan areas with less developed public transportation systems, includes the Anaheim-Santa Ana-Garden Grove, Detroit, Los Angeles-Long Beach, Pittsburgh, and Washington, D.C. SMSA's. Transportation Group C, representing other large and medium-sized metropolitan areas with well-established public transportation systems, has been subdivided into two regional groups. Group C-North includes the Albany-Schenectady-Troy, and Minneapolis-St. Paul areas; Group C-South and West includes the Dallas, Ft. Worth, Memphis, and Tacoma metropolitan areas. The final group, Transportation Group D, represents medium-sized and smaller SMSA's primarily oriented to automobile transportation. The seven SMSA's in Survey Group I which fall in this category are Madison, Orlando, Phoenix, Salt Lake City, Saginaw, Spokane, and Wichita.

Symbols used in this report. A dash (-) means rounds to or represents zero. An "X" means not applicable. The symbol (B) signifies that the base for the median is less than 1,000.

Travel distance to work. The one-way, "door-to-door" distance in miles that the person reported usually traveling from home to work during the week prior to interview was counted as the travel distance to work. Respondents were instructed to report travel distance rounded to the nearest mile. However, some heaping of the responses did occur; i.e., persons were more likely to report distances of 5, 10, 15, 20, etc., miles than values between these figures.

Travel time to work. The total elapsed time in minutes that the person reported it usually took to get from home to work during the week prior to interview was counted as the travel time to work. The elapsed time included time spent waiting for public transportation and picking up members of

carpools. Respondents were instructed to report travel time to the nearest minute. However, substantial heaping of the responses did occur; i.e., persons were much more likely to report travel times of 5, 10, 15, 20, 30, and 45 minutes than values between these figures. Some heaping also occurred at 25, 35, and 40 minutes, although not to the same extent. A large proportion of the heaping was presumably due to the daily variation in travel time to work experienced by most workers, plus the manner in which the question was asked ("How long does it *usually* take to get from home to work?").

Truck. The category "truck" includes workers using pick-up trucks, panel trucks, and other trucks of 1-ton capacity or

less. Workers who used larger trucks to get to work are classified as using "other means."

Worker. For purposes of the Travel-to-Work Supplement, a worker is any member of a sample household 14 years old or over who had a regular part-time or full-time job the week prior to interview. A job is defined as a definite arrangement for regular work for pay every week or every month. This included persons who operated their own business, professional practice, or farm. A household member was also considered to be a worker if the person had a regular job, but was temporarily absent from work due to illness, vacation, layoff, etc.

Appendix B. Reliability of the Estimates

There are two types of possible errors associated with data from sample surveys: sampling and nonsampling errors. The following is a description of the sampling and nonsampling errors associated with the DOT Travel-to-Work Supplement.

NONSAMPLING ERRORS

In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases, definitional difficulties, differences in the interpretation of questions, inability or unwillingness to provide correct information on the part of respondents, mistakes in recording or coding the data, and other errors of collection, response, processing, coverage, and estimation for missing data.

Proxy interviewing. One possible source of bias in the DOT Travel-to-Work Supplement data is proxy interviewing. That is, responses for a particular worker may have been given by someone else who is not as knowledgeable as the worker himself. For example, the person available for the interview may not know how long it takes the reference person (worker) to travel to work or whether or not the principal means of transportation to work is satisfactory to the worker. Although it is known that biases due to proxy interviewing, as well as other nonsampling errors, could exist in the DOT Travel-to-Work Supplement, their magnitude is unknown.

Preliminary estimates. In addition to proxy interviewing, the preliminary data presented in this report may vary somewhat from the final results for several reasons. First, the use of four reference months may introduce a seasonal bias into transportation use characteristics or a bias due to possible temporary disruptions in one or more modes. Second, the weighting procedure used for the data is not as complex as that which will be reflected in the final data, thus introducing the possibility of additional variation between the two tabulations. Third, these tabulations were prepared before the data had received a final edit. They may, therefore, be somewhat more affected by such factors as response inconsistency and other errors of collection than the final results.

Response accuracy. Reliability of the data on length and duration of the commuting trip may also have been affected by response accuracy. While most respondents could be expected to know approximately how many minutes it

usually takes to get to work, many workers, especially those using public transportation, may not know the exact number of miles their commuting trip covers.

Reinterview program. No reinterview program was undertaken for the DOT Travel-to-Work Supplement. However, for the 1975 AHS-SMSA sample a study was conducted to obtain a measurement of some of the components of the nonsampling error associated with the AHS estimates. Results of this study may be a useful indicator of the accuracy to be expected in the travel-to-work data which was collected as a supplement to the AHS-SMSA data. A detailed description can be found in the AHS Series H-170 reports for 1975.

SAMPLING ERRORS

The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules, instructions, and enumerators were used, estimates from each of the different samples would differ from each other. The deviation of a sample estimate from the average of all possible samples is defined as the sampling error. The standard error of a survey estimate attempts to provide a measure of this variation among the estimates from the possible samples and, thus, is a measure of the precision with which an estimate from a sample approximates the average result of all possible samples. Because estimates from the preliminary tabulation are based on roughly one-third the number of cases in the entire sample, the data presented in this report are more susceptible to sampling error than the final data will be.

As calculated for this survey, the standard error also partially measures the variation in the estimates due to response and enumerator errors (nonsampling errors), but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and nonsampling error measured by the standard error, biases, and some additional nonsampling errors not measured by the standard error.

The sample estimate and its estimated standard error enable the user to construct interval estimates in which the interval includes the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions, and an estimate and its

estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample, one can say with specified confidence that the average result of all possible samples is included in the constructed interval. All comparisons made in the text of the current report are significant within two standard errors.

The figures presented in the tables below are approximations to the standard errors of various estimates for SMSA's in Survey Group I. In order to derive standard errors that would be applicable to a wide variety of items and also could be prepared at a moderate cost, a number of approximations were required. As a result, the tables of standard errors provide an indication of the order of magnitude of the standard errors rather than precise standard errors for any specific item.

Tables B-1 through B-12 present the standard errors applicable to estimates of travel-to-work characteristics of persons 14 years and older who were employed at the time of the 1977-78 AHS-SMSA survey. Included in these tables are estimates of standard errors for estimates of zero and zero percent. These estimates of standard errors are considered as overestimates of the true standard errors and should be used primarily for construction of confidence intervals for characteristics when an estimate of zero is obtained. Standard errors for estimates of medians shown in the text of the current report are displayed with the median.

For ratios, $100 x/y$, where x is not a subclass of y , tables B-3 through B-12 underestimate the standard error of the ratio when there is little or no correlation between x and y . For this type of ratio, a better approximation of the standard error may be obtained by letting the standard error of the ratio be approximately equal to:

$$(100)\left(\frac{x}{y}\right)\sqrt{\left(\frac{\sigma_x}{x}\right)^2 + \left(\frac{\sigma_y}{y}\right)^2}$$

where: x = the numerator of the ratio
 y = the denominator of the ratio
 σ_x = the standard error of the numerator
 σ_y = the standard error of the denominator

Illustration of the use of the standard error tables. The results of the DOT Supplement indicate that in 1977 in the

20 SMSA's surveyed, 12,544,000 workers used vehicles to travel to work. Interpolation in table B-2 shows that the standard error of an estimate of this size is approximately 49,665. Consequently, the 68-percent confidence interval, as shown by these data, is from 12,494,335 to 12,593,665 workers. Therefore, a conclusion that the average estimate, derived from all possible samples, of 1977 workers who used vehicles to travel to work lies within a range computed in this way would be correct for roughly 68-percent of all possible samples. Similarly, we could conclude that the average estimate, derived from all possible samples, lies within the interval from 12,464,536 to 12,623,464 workers with 90-percent confidence and within the interval from 12,444,670 to 12,643,330 workers with 95-percent confidence.

Also, of the 12,544,000 workers who used vehicles to travel to work, 9,062,000 or 72.2 percent, drove alone. Interpolation in table B-10 shows that the standard error of the percent is approximately 0.3 percentage points.

Consequently, the 68-percent confidence interval, as shown by these data, is from 71.9 to 72.5 percent; the 90-percent confidence interval is from 71.7 to 72.7 percent; and the 95-percent confidence interval is from 71.6 to 72.8 percent.

Differences. The standard errors shown are not directly applicable to differences between two sample estimates. The standard error of a difference between estimates is approximately equal to the square root of the sum of the squares of the standard error of each estimate considered separately. This formula is quite accurate for the difference between estimates of the same characteristic in two different SMSA's or the difference between separate and uncorrelated characteristics in the same SMSA. However, if there is a high positive correlation between the two characteristics the formula will overestimate the true standard error; whereas, if there is a high negative correlation, the formula will underestimate the true standard error. This is likely to occur when comparing percentages calculated on the same base.

Illustration of the computation of the standard error of a difference. The results of the DOT Supplement show that in 1977 there were 2,266,000 workers who commuted by carpool in the 20 SMSA's. Thus, the apparent difference, as shown by these data, between commuters who carpooled and commuters who drove alone in 1977 is 6,796,000. Interpolation in table B-2 shows the standard error of 9,062,000 is approximately 47,738, and the standard error of 2,266,000 is approximately 28,546. Therefore, the standard error of the estimated difference of 6,796,000 is about 55,622.

$$55,622 = \sqrt{(47,738)^2 + (28,546)^2}$$

Consequently, the 68-percent confidence interval for the 6,796,000 difference is from 6,740,378 to 6,851,622 workers. Therefore, a conclusion that the average estimate of this difference, derived from all possible samples, lies within a range computed in this way would be correct for roughly

Table B-2. Standard Errors of Estimated Number of Workers in the Total 20 SMSA's and in the Transportation Groups: 1977

(68 chances out of 100. For meaning of symbols, see appendix A)

Size of estimate	Standard error					
	Total, 20 SMSA's	Group A	Group B	Group C- North	Group C- South and West	Group D
0.....	400	330	500	360	270	140
25.....	400	330	500	360	270	140
50.....	400	330	500	360	270	140
100.....	400	330	500	360	270	140
200.....	400	330	500	360	270	170
500.....	450	410	500	420	360	270
700.....	530	480	590	500	430	320
1,000.....	630	570	710	600	520	380
2,500.....	1,000	910	1,120	950	810	600
5,000.....	1,420	1,280	1,580	1,340	1,150	840
10,000.....	2,000	1,610	2,240	1,890	1,630	1,190
25,000.....	3,160	2,860	3,530	2,980	2,570	1,880
50,000.....	4,470	4,030	4,990	4,190	3,610	2,650
75,000.....	5,470	4,920	6,110	5,100	4,410	3,220
100,000.....	6,320	5,660	7,050	5,850	5,060	3,710
150,000.....	7,730	6,880	8,610	7,070	6,150	4,500
200,000.....	8,910	7,880	9,930	8,050	7,030	5,140
250,000.....	9,960	8,740	11,080	8,870	7,780	5,700
300,000.....	10,900	9,500	12,120	9,570	8,440	6,180
400,000.....	12,560	10,790	13,940	10,720	9,560	6,990
500,000.....	14,010	11,870	15,530	11,600	10,460	7,650
600,000.....	15,320	12,770	16,940	12,270	11,210	8,200
700,000.....	16,510	13,550	18,230	12,760	11,830	8,650
800,000.....	17,610	14,220	19,420	13,090	12,350	9,030
900,000.....	18,640	14,790	20,520	13,290	12,770	9,330
1,000,000.....	19,610	15,280	21,550	13,340	13,110	9,580
1,500,000.....	23,770	16,680	25,870	11,410	13,680	9,980
2,000,000.....	27,150	16,570	29,270	-	12,470	9,060
3,000,000.....	32,520	11,100	34,320	-	-	-
4,000,000.....	36,690	-	37,770	-	-	-
5,000,000.....	40,030	-	40,060	-	-	-
8,000,000.....	46,680	-	41,320	-	-	-
11,000,000.....	49,670	-	34,130	-	-	-
14,000,000.....	49,660	-	-	-	-	-
17,000,000.....	46,660	-	-	-	-	-
20,000,000.....	40,000	-	-	-	-	-
24,000,000.....	19,520	-	-	-	-	-

Standard Errors for Estimated Percentage of Workers

Table B-3. Saginaw, Mich.: 1977

(8 chances out of 100)

Size of percentage	Estimated percentage ¹					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
.....	68.4	68.4	68.4	68.4	68.4	73.6
.....	52.0	52.0	52.0	52.0	52.0	52.0
.....	35.1	35.1	35.1	35.1	35.1	36.8
.....	21.3	21.3	21.3	21.3	22.5	26.0
.....	9.8	9.8	9.8	9.9	14.3	16.5
.....	7.2	7.2	7.2	8.3	12.0	13.9
.....	5.1	5.1	5.1	7.0	10.1	11.6
.....	2.1	2.1	3.2	4.4	6.4	7.4
.....	1.1	1.1	2.3	3.1	4.5	5.2
.....	0.5	0.7	1.6	2.2	3.2	3.7
.....	0.2	0.5	1.0	1.4	2.0	2.3
.....	0.11	0.3	0.7	1.0	1.4	1.6
.....	0.07	0.3	0.6	0.8	1.2	1.3
.....	0.05	0.2	0.5	0.7	1.0	1.2
.....	0.04	0.2	0.4	0.6	0.8	1.0
.....	0.03	0.2	0.4	0.5	0.7	0.8

¹Standard errors are presented to the nearest one-tenth of 1 percentage point, except when the standard error is less than two-tenths of 1 percentage point. In those cases the standard error is shown to the nearest one-hundredth of 1 percent.

Table B-4. Madison, Wis.; and Spokane, Wash.: 1977

(8 chances out of 100)

Size of percentage	Estimated percentage ¹					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
.....	77.0	77.0	77.0	77.0	79.2	91.5
.....	62.6	62.6	62.6	62.6	62.6	64.7
.....	45.6	45.6	45.6	45.6	45.6	45.7
.....	29.5	29.5	29.5	29.5	29.5	32.3
.....	14.3	14.3	14.3	14.3	17.7	20.5
.....	10.7	10.7	10.7	10.7	15.0	17.3
.....	7.7	7.7	7.7	8.7	12.5	14.5
.....	3.2	3.2	4.0	5.5	7.9	9.1
.....	1.6	1.6	2.8	3.9	5.6	6.5
.....	0.8	0.9	2.0	2.7	4.0	4.6
.....	0.3	0.6	1.3	1.7	2.5	2.9
.....	0.2	0.4	0.9	1.2	1.8	2.0
.....	0.11	0.3	0.7	1.0	1.4	1.7
.....	0.08	0.3	0.6	0.9	1.3	1.4
.....	0.06	0.2	0.5	0.7	1.0	1.2
.....	0.04	0.2	0.4	0.6	0.9	1.0
.....	0.03	0.2	0.4	0.5	0.8	0.9

¹Standard errors are presented to the nearest one-tenth of 1 percentage point, except when the standard error is less than two-tenths of 1 percentage point. In those cases the standard error is shown to the nearest one-hundredth of 1 percent.

Standard Errors for Estimated Percentage of Workers

Table B-5. Tacoma, Wash.; and Wichita, Kans.: 1977

(68 chances out of 100)

Base of percentage	Estimated percentage ¹					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
25.....	81.4	81.4	81.4	81.4	90.5	104.5
50.....	68.6	68.6	68.6	68.6	68.6	73.9
100.....	52.2	52.2	52.2	52.2	52.2	52.2
200.....	35.3	35.3	35.3	35.3	35.3	36.9
500.....	17.9	17.9	17.9	17.9	20.2	23.4
700.....	13.5	13.5	13.5	13.5	17.1	19.7
1,000.....	9.8	9.8	9.8	9.9	14.3	16.5
2,500.....	4.2	4.2	4.6	6.3	9.0	10.4
5,000.....	2.1	2.1	3.2	4.4	6.4	7.4
10,000.....	1.1	1.1	2.3	3.1	4.5	5.2
25,000.....	0.4	0.7	1.4	2.0	2.9	3.3
50,000.....	0.2	0.5	1.0	1.4	2.0	2.3
75,000.....	0.15	0.4	0.8	1.1	1.7	1.9
100,000.....	0.11	0.3	0.7	1.0	1.4	1.7
150,000.....	0.07	0.3	0.6	0.8	1.2	1.3
200,000.....	0.05	0.2	0.5	0.7	1.0	1.2
250,000.....	0.04	0.2	0.5	0.6	0.9	1.0
300,000.....	0.04	0.2	0.4	0.6	0.8	1.0
400,000.....	0.03	0.2	0.4	0.5	0.7	0.8

¹Standard errors are presented to the nearest one-tenth of 1 percentage point, except when the standard error is less than two-tenths of 1 percentage point. In those cases the standard error is shown to the nearest one-hundredth of 1 percent.

Table B-6. Group D; Orlando, Fla.; and Salt Lake City, Utah: 1977

(68 chances out of 100)

Base of percentage	Estimated percentage ¹					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
25.....	86.1	86.1	86.1	86.1	107.6	124.2
50.....	75.5	75.5	75.5	75.5	76.1	87.8
100.....	60.7	60.7	60.7	60.7	60.7	62.1
200.....	43.5	43.5	43.5	43.5	43.5	43.9
500.....	23.6	23.6	23.6	23.6	24.0	27.8
700.....	18.1	18.1	18.1	18.1	20.3	23.5
1,000.....	13.4	13.4	13.4	13.4	17.0	19.6
2,500.....	5.8	5.8	5.8	7.5	10.8	12.4
5,000.....	3.0	3.0	3.8	5.3	7.6	8.8
10,000.....	1.5	1.5	2.7	3.7	5.4	6.2
25,000.....	0.6	0.8	1.7	2.4	3.4	3.9
50,000.....	0.3	0.6	1.2	1.7	2.4	2.8
75,000.....	0.2	0.5	1.0	1.4	2.0	2.3
100,000.....	0.15	0.4	0.9	1.2	1.7	2.0
150,000.....	0.10	0.3	0.7	1.0	1.4	1.6
200,000.....	0.08	0.3	0.6	0.8	1.2	1.4
250,000.....	0.06	0.2	0.5	0.7	1.1	1.2
300,000.....	0.05	0.2	0.5	0.7	1.0	1.1
400,000.....	0.04	0.2	0.4	0.6	0.9	1.0
500,000.....	0.03	0.2	0.4	0.5	0.8	0.9
600,000.....	0.03	0.2	0.3	0.5	0.7	0.8
700,000.....	0.02	0.15	0.3	0.4	0.6	0.7
800,000.....	0.02	0.14	0.3	0.4	0.6	0.7
900,000.....	0.02	0.13	0.3	0.4	0.6	0.7
1,000,000.....	0.02	0.12	0.3	0.4	0.5	0.6
1,500,000.....	0.01	0.10	0.2	0.3	0.4	0.5
2,000,000.....	0.01	0.09	0.2	0.3	0.4	0.4
3,000,000.....	0.01	0.07	0.2	0.2	0.3	0.4

¹Standard errors are presented to the nearest one-tenth of 1 percentage point, except when the standard error is less than two-tenths of 1 percentage point. In those cases the standard error is shown to the nearest one-hundredth of 1 percent.

Standard Errors for Estimated Percentage of Workers

Table B-7. Albany-Schenectady-Troy, N.Y.; Fort Worth, Tex.; and Memphis, Tenn.-Ark.: 1977

(68 chances out of 100)

Base of percentage	Estimated percentage ¹					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
5.....	89.6	89.6	89.6	89.6	127.2	146.9
10.....	81.2	81.2	81.2	81.2	89.9	103.8
20.....	68.3	68.3	68.3	68.3	68.3	73.4
50.....	51.9	51.9	51.9	51.9	51.9	51.9
100.....	30.1	30.1	30.1	30.1	30.1	32.8
200.....	23.6	23.6	23.6	23.6	24.0	27.8
500.....	17.7	17.7	17.7	17.7	20.1	23.2
1,000.....	7.9	7.9	7.9	8.8	12.7	14.7
2,500.....	4.1	4.1	4.5	6.2	9.0	10.4
5,000.....	2.1	2.1	3.2	4.4	6.4	7.3
10,000.....	0.9	0.9	2.0	2.8	4.0	4.6
25,000.....	0.4	0.7	1.4	2.0	2.8	3.3
50,000.....	0.3	0.5	1.2	1.6	2.3	2.7
100,000.....	0.2	0.5	1.0	1.4	2.0	2.3
250,000.....	0.14	0.4	0.8	1.1	1.6	1.9
500,000.....	0.11	0.3	0.7	1.0	1.4	1.6
1,000,000.....	0.09	0.3	0.6	0.9	1.3	1.5
2,500,000.....	0.07	0.3	0.6	0.8	1.2	1.3
5,000,000.....	0.05	0.2	0.5	0.7	1.0	1.2
10,000,000.....	0.04	0.2	0.5	0.6	0.9	1.0
25,000,000.....	0.04	0.2	0.4	0.6	0.8	0.9
50,000,000.....	0.03	0.2	0.4	0.5	0.8	0.9

¹Standard errors are presented to the nearest one-tenth of 1 percentage point, except when the standard error is less than two-tenths of 1 percentage point. In those cases the standard error is shown to the nearest one-hundredth of 1 percent.

Table B-8. Boston, Mass.; Group C-South and West; and Washington, D.C.-Md.-Va.: 1977

(68 chances out of 100)

Base of percentage	Estimated percentage ¹					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
5.....	92.0	92.0	92.0	101.6	146.6	169.3
10.....	85.1	85.1	85.1	85.1	103.7	119.7
20.....	74.1	74.1	74.1	74.1	74.1	84.6
50.....	58.9	58.9	58.9	58.9	58.9	59.9
100.....	36.4	36.4	36.4	36.4	36.4	37.9
200.....	29.0	29.0	29.0	29.0	29.0	32.0
500.....	22.3	22.3	22.3	22.3	23.2	26.8
1,000.....	10.3	10.3	10.3	10.3	14.7	16.9
2,500.....	5.4	5.4	5.4	7.2	10.4	12.0
5,000.....	2.8	2.8	3.7	5.1	7.3	8.5
10,000.....	1.1	1.1	2.3	3.2	4.6	5.4
25,000.....	0.6	0.8	1.7	2.3	3.3	3.8
50,000.....	0.4	0.6	1.3	1.9	2.7	3.1
100,000.....	0.3	0.5	1.2	1.6	2.3	2.7
250,000.....	0.2	0.4	1.0	1.3	1.9	2.2
500,000.....	0.14	0.4	0.8	1.1	1.6	1.9
1,000,000.....	0.11	0.3	0.7	1.0	1.5	1.7
2,500,000.....	0.10	0.3	0.7	0.9	1.3	1.5
5,000,000.....	0.07	0.3	0.6	0.8	1.2	1.3
10,000,000.....	0.06	0.2	0.5	0.7	1.0	1.2
25,000,000.....	0.05	0.2	0.5	0.7	0.9	1.1
50,000,000.....	0.04	0.2	0.4	0.6	0.9	1.0
100,000,000.....	0.04	0.2	0.4	0.6	0.8	0.9
250,000,000.....	0.03	0.2	0.4	0.5	0.8	0.9
500,000,000.....	0.03	0.2	0.4	0.5	0.7	0.8
1,000,000,000.....	0.03	0.2	0.4	0.5	0.7	0.8
2,500,000,000.....	0.02	0.14	0.3	0.4	0.6	0.7
5,000,000,000.....	0.01	0.12	0.3	0.4	0.5	0.6
10,000,000,000.....	0.01	0.10	0.2	0.3	0.4	0.5

¹Standard errors are presented to the nearest one-tenth of 1 percentage point, except when the standard error is less than two-tenths of 1 percentage point. In those cases the standard error is shown to the nearest one-hundredth of 1 percent.

Standard Errors for Estimated Percentage of Workers

Table B-9. Group A; Group C-North; and Phoenix, Ariz.: 1977

(68 chances out of 100)

Base of percentage	Estimated percentage ¹					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
25.....	93.5	93.5	93.5	113.9	164.3	189.8
50.....	87.8	87.8	87.8	87.8	116.2	134.2
100.....	78.3	78.3	78.3	78.3	82.2	94.9
200.....	64.3	64.3	64.3	64.3	64.3	67.1
500.....	41.9	41.9	41.9	41.9	41.9	42.4
700.....	34.0	34.0	34.0	34.0	34.0	35.9
1,000.....	26.5	26.5	26.5	26.5	26.5	30.0
2,500.....	12.6	12.6	12.6	12.6	16.4	19.0
5,000.....	6.7	6.7	6.7	8.1	11.6	13.4
10,000.....	3.5	3.5	4.1	5.7	8.2	9.5
25,000.....	1.4	1.4	2.6	3.6	5.2	6.0
50,000.....	0.7	0.8	1.8	2.5	3.7	4.2
75,000.....	0.5	0.7	1.5	2.1	3.0	3.5
100,000.....	0.4	0.6	1.3	1.8	2.6	3.0
150,000.....	0.2	0.5	1.1	1.5	2.1	2.4
200,000.....	0.18	0.4	0.9	1.3	1.8	2.1
250,000.....	0.14	0.4	0.8	1.1	1.6	1.9
300,000.....	0.12	0.3	0.8	1.0	1.5	1.7
400,000.....	0.09	0.3	0.7	0.9	1.3	1.5
500,000.....	0.07	0.3	0.6	0.8	1.2	1.3
600,000.....	0.06	0.2	0.5	0.7	1.1	1.2
700,000.....	0.05	0.2	0.5	0.7	1.0	1.1
800,000.....	0.04	0.2	0.5	0.6	0.9	1.1
900,000.....	0.04	0.2	0.4	0.6	0.9	1.0
1,000,000.....	0.04	0.19	0.4	0.6	0.8	0.9
1,500,000.....	0.02	0.15	0.3	0.5	0.7	0.8
2,000,000.....	0.02	0.13	0.3	0.4	0.6	0.7
3,000,000.....	0.01	0.11	0.2	0.3	0.5	0.5
4,000,000.....	0.01	0.09	0.2	0.3	0.4	0.5

¹Standard errors are presented to the nearest one-tenth of 1 percentage point, except when the standard error is less than two-tenths of 1 percentage point. In those cases the standard error is shown to the nearest one-hundredth of 1 percent.

Standard Errors for Estimated Percentage of Workers

Table B-10. Anaheim-Santa Ana-Garden Grove, Calif.; Detroit, Mich.; and the Group Consisting of All 20 SMSA's: 1977

68 chances out of 100)

Base of percentage	Estimated percentage ¹					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
25.....	94.5	94.5	94.5	124.1	179.1	206.8
50.....	89.5	89.5	89.5	89.5	126.6	146.2
100.....	81.0	81.0	81.0	81.0	89.5	103.4
200.....	68.1	68.1	68.1	68.1	68.1	73.1
500.....	46.1	46.1	46.1	46.1	46.1	46.2
700.....	37.9	37.9	37.9	37.9	37.9	39.1
1,000.....	30.0	30.0	30.0	30.0	30.0	32.7
2,500.....	14.6	14.6	14.6	14.6	17.9	20.7
5,000.....	7.9	7.9	7.9	8.8	12.7	14.6
10,000.....	4.1	4.1	4.5	6.2	9.0	10.3
25,000.....	1.7	1.7	2.9	3.9	5.7	6.5
50,000.....	0.8	0.9	2.0	2.8	4.0	4.6
75,000.....	0.6	0.8	1.6	2.3	3.3	3.8
100,000.....	0.4	0.7	1.4	2.0	2.8	3.3
150,000.....	0.3	0.5	1.2	1.6	2.3	2.7
200,000.....	0.2	0.5	1.0	1.4	2.0	2.3
250,000.....	0.17	0.4	0.9	1.2	1.8	2.1
300,000.....	0.14	0.4	0.8	1.1	1.6	1.9
400,000.....	0.11	0.3	0.7	1.0	1.4	1.6
500,000.....	0.09	0.3	0.6	0.9	1.3	1.5
600,000.....	0.07	0.3	0.6	0.8	1.2	1.3
700,000.....	0.06	0.2	0.5	0.7	1.1	1.2
800,000.....	0.05	0.2	0.5	0.7	1.0	1.2
900,000.....	0.05	0.2	0.5	0.7	0.9	1.1
1,000,000.....	0.04	0.2	0.5	0.6	0.9	1.0
1,500,000.....	0.03	0.17	0.4	0.5	0.7	0.8
2,000,000.....	0.02	0.15	0.3	0.4	0.6	0.7
3,000,000.....	0.01	0.12	0.3	0.4	0.5	0.6
4,000,000.....	0.01	0.10	0.2	0.3	0.4	0.5
5,000,000.....	0.01	0.09	0.2	0.3	0.4	0.5
8,000,000.....	0.01	0.07	0.16	0.2	0.3	0.4
11,000,000.....	0.01	0.06	0.14	0.19	0.3	0.3
14,000,000.....	0.01	0.05	0.12	0.17	0.2	0.3
17,000,000.....	0.01	0.05	0.11	0.15	0.2	0.3
20,000,000.....	0.01	0.05	0.10	0.14	0.2	0.2
24,000,000.....	0.01	0.04	0.09	0.13	0.18	0.2

¹Standard errors are presented to the nearest one-tenth of 1 percentage point, except when the standard error is less than two-tenths of 1 percentage point. In those cases the standard error is shown to the nearest one-hundredth of 1 percent.

Standard Errors for Estimated Percentage of Workers

Table B-11. Dallas, Tex.; Group B; Minneapolis-St. Paul, Minn.; and Newark, N.J.: 1977

(68 chances out of 100)

Base of percentage	Estimated percentage ¹					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
25.....	95.2	95.2	97.5	134.2	193.7	223.0
50.....	90.9	90.9	90.9	94.9	136.9	158.1
100.....	83.3	83.3	83.3	83.3	96.8	111.8
200.....	71.4	71.4	71.4	71.4	71.4	79.1
500.....	50.0	50.0	50.0	50.0	50.0	50.0
700.....	41.7	41.7	41.7	41.7	41.7	42.3
1,000.....	33.3	33.3	33.3	33.3	33.3	35.4
2,500.....	16.7	16.7	16.7	16.7	19.4	22.4
5,000.....	9.1	9.1	9.1	9.5	13.7	15.8
10,000.....	4.8	4.8	4.9	6.7	9.7	11.2
25,000.....	2.0	2.0	3.1	4.2	6.1	7.1
50,000.....	1.0	1.0	2.2	3.0	4.3	5.0
75,000.....	0.7	0.8	1.8	2.4	3.5	4.1
100,000.....	0.5	0.7	1.5	2.1	3.1	3.5
150,000.....	0.3	0.6	1.3	1.7	2.5	2.9
200,000.....	0.2	0.5	1.1	1.5	2.2	2.5
250,000.....	0.2	0.4	1.0	1.3	1.9	2.2
300,000.....	0.2	0.4	0.9	1.2	1.8	2.0
400,000.....	0.1	0.4	0.8	1.1	1.5	1.8
500,000.....	0.10	0.3	0.7	0.9	1.4	1.6
600,000.....	0.08	0.3	0.6	0.9	1.3	1.4
700,000.....	0.07	0.3	0.6	0.8	1.2	1.3
800,000.....	0.06	0.2	0.5	0.8	1.1	1.3
900,000.....	0.06	0.2	0.5	0.7	1.0	1.2
1,000,000.....	0.05	0.2	0.5	0.7	1.0	1.1
1,500,000.....	0.03	0.2	0.4	0.5	0.8	0.9
2,000,000.....	0.02	0.2	0.3	0.5	0.7	0.8
3,000,000.....	0.02	0.13	0.3	0.4	0.6	0.6
4,000,000.....	0.01	0.11	0.2	0.3	0.5	0.6
5,000,000.....	0.01	0.10	0.2	0.3	0.4	0.5
8,000,000.....	0.01	0.08	0.17	0.2	0.3	0.4
11,000,000.....	0.01	0.07	0.15	0.2	0.3	0.3
14,000,000.....	0.01	0.06	0.13	0.2	0.3	0.3

¹Standard errors are presented to the nearest one-tenth of 1 percentage point, except when the standard error is less than two-tenths of 1 percentage point. In those cases the standard error is shown to the nearest one-hundredth of 1 percent.

Standard Errors for Estimated Percentage of Workers

Table B-12. Los Angeles-Long Beach, Calif.; and Pittsburgh, Penn.: 1977

(8 chances out of 100)

Size of percentage	Estimated percentage ¹					
	0 or 100	1 or 99	5 or 95	10 or 90	25 or 75	50
.....	96.6	96.6	116.1	159.9	230.8	266.5
.....	93.4	93.4	93.4	113.1	163.2	188.4
0.....	87.7	87.7	87.7	87.7	115.4	133.2
0.....	78.0	78.0	78.0	78.0	81.6	94.2
0.....	58.7	58.7	58.7	58.7	58.7	59.6
0.....	50.4	50.4	50.4	50.4	50.4	50.4
000.....	41.5	41.5	41.5	41.5	41.5	42.1
500.....	22.1	22.1	22.1	22.1	23.1	26.6
000.....	12.4	12.4	12.4	12.4	16.3	18.8
,000.....	6.6	6.6	6.6	8.0	11.5	13.3
,000.....	2.8	2.8	3.7	5.1	7.3	8.4
,000.....	1.4	1.4	2.6	3.6	5.2	6.0
,000.....	0.9	1.0	2.1	2.9	4.2	4.9
0,000.....	0.7	0.8	1.8	2.5	3.6	4.2
0,000.....	0.5	0.7	1.5	2.1	3.0	3.4
0,000.....	0.4	0.6	1.3	1.8	2.6	3.0
0,000.....	0.3	0.5	1.2	1.6	2.3	2.7
0,000.....	0.2	0.5	1.1	1.5	2.1	2.4
0,000.....	0.2	0.4	0.9	1.3	1.8	2.1
0,000.....	0.14	0.4	0.8	1.1	1.6	1.9
00,000.....	0.12	0.3	0.7	1.0	1.5	1.7
00,000.....	0.10	0.3	0.7	1.0	1.4	1.6
00,000.....	0.09	0.3	0.6	0.9	1.3	1.5
00,000.....	0.08	0.3	0.6	0.8	1.2	1.4
000,000.....	0.07	0.3	0.6	0.8	1.2	1.3
,500,000.....	0.05	0.2	0.5	0.7	0.9	1.1
,000,000.....	0.04	0.2	0.4	0.6	0.8	0.9
,000,000.....	0.02	0.2	0.3	0.5	0.7	0.8
,000,000.....	0.02	0.13	0.3	0.4	0.6	0.7
,000,000.....	0.01	0.12	0.3	0.4	0.5	0.6

¹Standard errors are presented to the nearest one-tenth of 1 percentage point, except when the standard error is less than two-tenths of 1 percentage point. In those cases the standard error is shown to the nearest one-hundredth of 1 percent.

Appendix C. Facsimile of the Travel-to-Work Supplement

↓ ~ PGM 8	Line number of worker	Line number of respondent	If last worker in this household, mark this box → <input type="checkbox"/>
3a. What is ...'s principal means of transportation to work?		(388)	(389)
(390) <input type="checkbox"/> Truck } <input type="checkbox"/> Car or carpool } →			
(391) <input type="checkbox"/> Drives alone – Skip to 4a <input type="checkbox"/> Shares driving } <input type="checkbox"/> Drives others } Skip to 3c <input type="checkbox"/> Rides with someone else } <input type="checkbox"/> Walks only – Skip to 4a <input type="checkbox"/> Works at home – Skip to 8a <input type="checkbox"/> Railroad <input type="checkbox"/> Subway or elevated <input type="checkbox"/> Bus or streetcar <input type="checkbox"/> Taxicab <input type="checkbox"/> Motorcycle <input type="checkbox"/> Bicycle <input type="checkbox"/> Other means – Specify _____			
b. Does ... usually ALSO use a car for part of the trip to work?			
(392) <input type="checkbox"/> Yes <input type="checkbox"/> No – Skip to 4a			
c. How many people, including ..., usually ride in the car to work?			
(393) _____ Number			
4a. Does ... usually WORK at the same location each day?			
(394) <input type="checkbox"/> Yes – Skip to 4c <input type="checkbox"/> No			
b. Does ... usually REPORT to the same location to begin work each day?			
(395) <input type="checkbox"/> Yes <input type="checkbox"/> No – Skip to 8a			
c. (1) What is the street address at that location?			
Note – If address (number and street name) are not known, enter building name, shopping center name, or other physical location description.			

(2) What are the nearest intersecting streets?			

(3) In what city, town, village, borough, is this located?			

(4) What is the county, State, and ZIP code?			
County _____			
State _____ ZIP code _____			
(5) For whom does ... work?			
Company or business establishment name _____			
4d. Is ...'s place of work inside the incorporated (legal) limits of (name of city, town, village, etc., listed in 4c(3)?			
(396) <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know			
5. What time does ... usually leave for work?			
(397) _____ Time			
(398) <input type="checkbox"/> a.m. <input type="checkbox"/> p.m.			
6. How many minutes does it usually take ... to get from home to work?			
(399) _____ Minutes			
7. How many miles does ... usually travel from home to work?			
(400) _____ Miles OR <input type="checkbox"/> Less than 1 mile			
8a. In the last year, has ... changed his principal means of transportation to work?			
(401) <input type="checkbox"/> Yes <input type="checkbox"/> No – Skip to 9			
b. What was ...'s principal means of transportation to work (prior to the change)?			
(402) <input type="checkbox"/> Truck }			
<input type="checkbox"/> Car or carpool } →			
(403) <input type="checkbox"/> Drove alone			
<input type="checkbox"/> Shared driving			
<input type="checkbox"/> Drove others			
<input type="checkbox"/> Rode with someone else			
<input type="checkbox"/> Walked only			
<input type="checkbox"/> Worked at home			
<input type="checkbox"/> Railroad			
<input type="checkbox"/> Subway or elevated			
<input type="checkbox"/> Bus or streetcar			
<input type="checkbox"/> Taxicab			
<input type="checkbox"/> Motorcycle			
<input type="checkbox"/> Bicycle			
<input type="checkbox"/> Other means – Specify _____			
9. If "Yes" marked in 8a – ASK Compared to ...'s previous means of transportation to work (Given in 8b), how satisfied is ... with his present means of transportation to work – much more, more, about the same, less or much less satisfied?		If "No" marked in 8a – ASK Compared to a year ago, how satisfied is ... now with his principal means of transportation to work – much more, more, about the same, less or much less satisfied?	
(404) <input type="checkbox"/> Much more satisfied			
<input type="checkbox"/> More satisfied			
<input type="checkbox"/> About the same satisfaction			
<input type="checkbox"/> Less satisfied			
<input type="checkbox"/> Much less satisfied			
<input type="checkbox"/> Don't know			
<input type="checkbox"/> Did not work last year			

**Go to Check Item A, page 40 for the HEAD.
OR
If last worker, go to item I, Section IV.**



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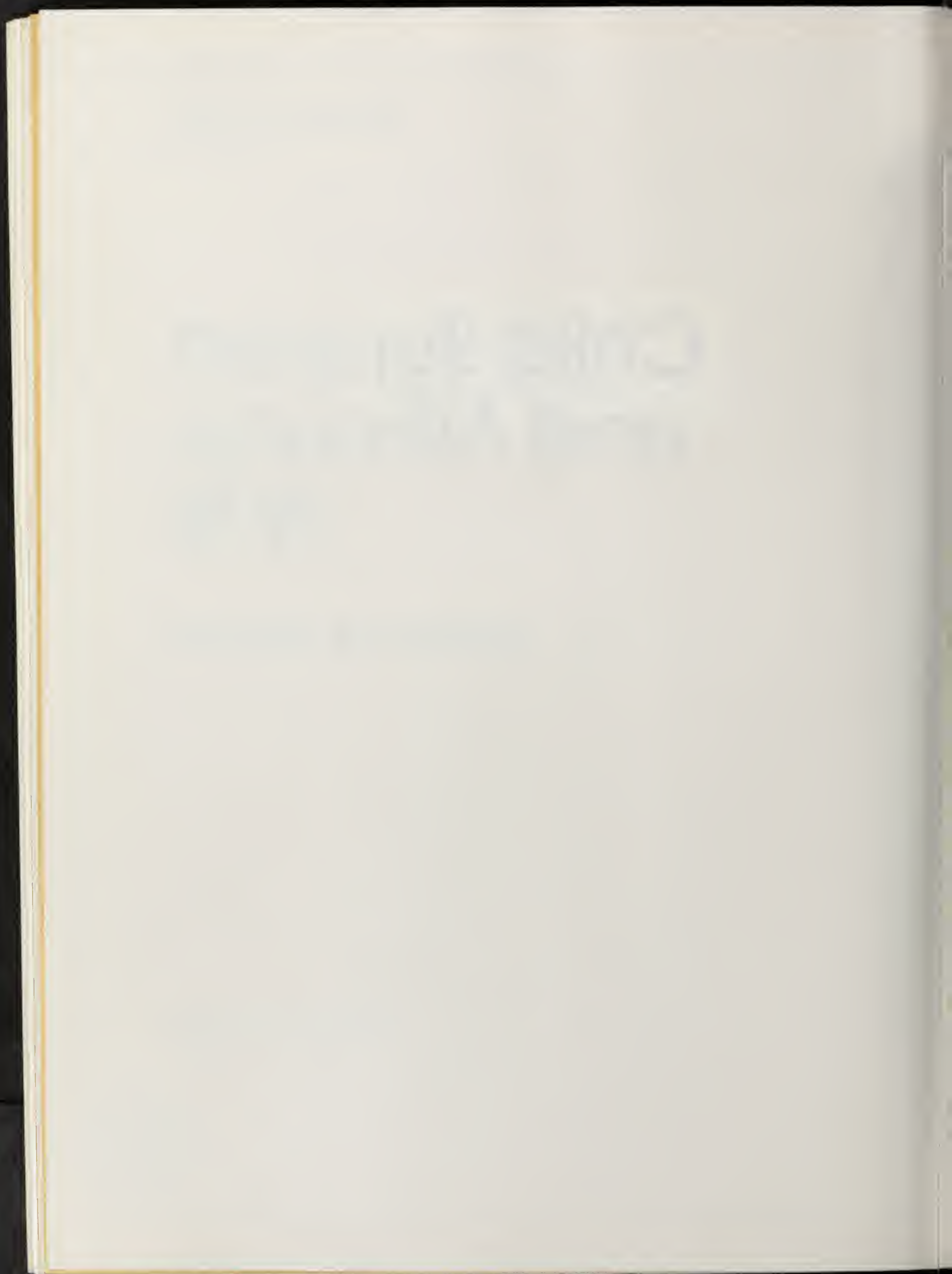
Special Studies

Series P-23, No. 106

Child Support and Alimony: 1978

(Advance Report)

U.S. Department of Commerce
BUREAU OF THE CENSUS



CURRENT POPULATION REPORTS

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Series P-23, No. 106
Issued September 1980

**Child Support
and Alimony:
1978**

(Advance Report)



U.S. Department of Commerce

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ACKNOWLEDGMENTS

This report was prepared by **Ruth A. Sanders**, under the general direction of **Gordon W. Green, Jr.**, Chief of the Income and Poverty Statistics Branch. Assistance in preparation of the data file was provided by **Kenneth A. Riccini** and **James E. Brenon** of the Demographic Surveys Division, and **George F. Patterson** and **John F. Coder** of the Population Division. Assistance in preparation of tables was provided by **Mary F. Henson** and **Robert W. Cleveland**. The publication was edited by **Paula Coupe**, Publications Services Division. Statistical review was conducted by **David R. Judkins** of the Statistical Methods Division. Several helpful comments on the analysis were received from **Paul C. Glick**, Senior Demographer, and **Arthur J. Norton**, Assistant Division Chief, (Demographic Social Statistics Programs). Overall direction was provided by **Roger A. Herriot**, Assistant Division Chief, (Socioeconomic Statistics Programs), Population Division. In addition, several helpful comments were received from colleagues at the Social Security Administration and the Department of Health and Human Services.

SUGGESTED CITATION

U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 106, *Child Support and Alimony: 1978 (Advance Report)*, U.S. Government Printing Office, Washington, D.C. 1980.

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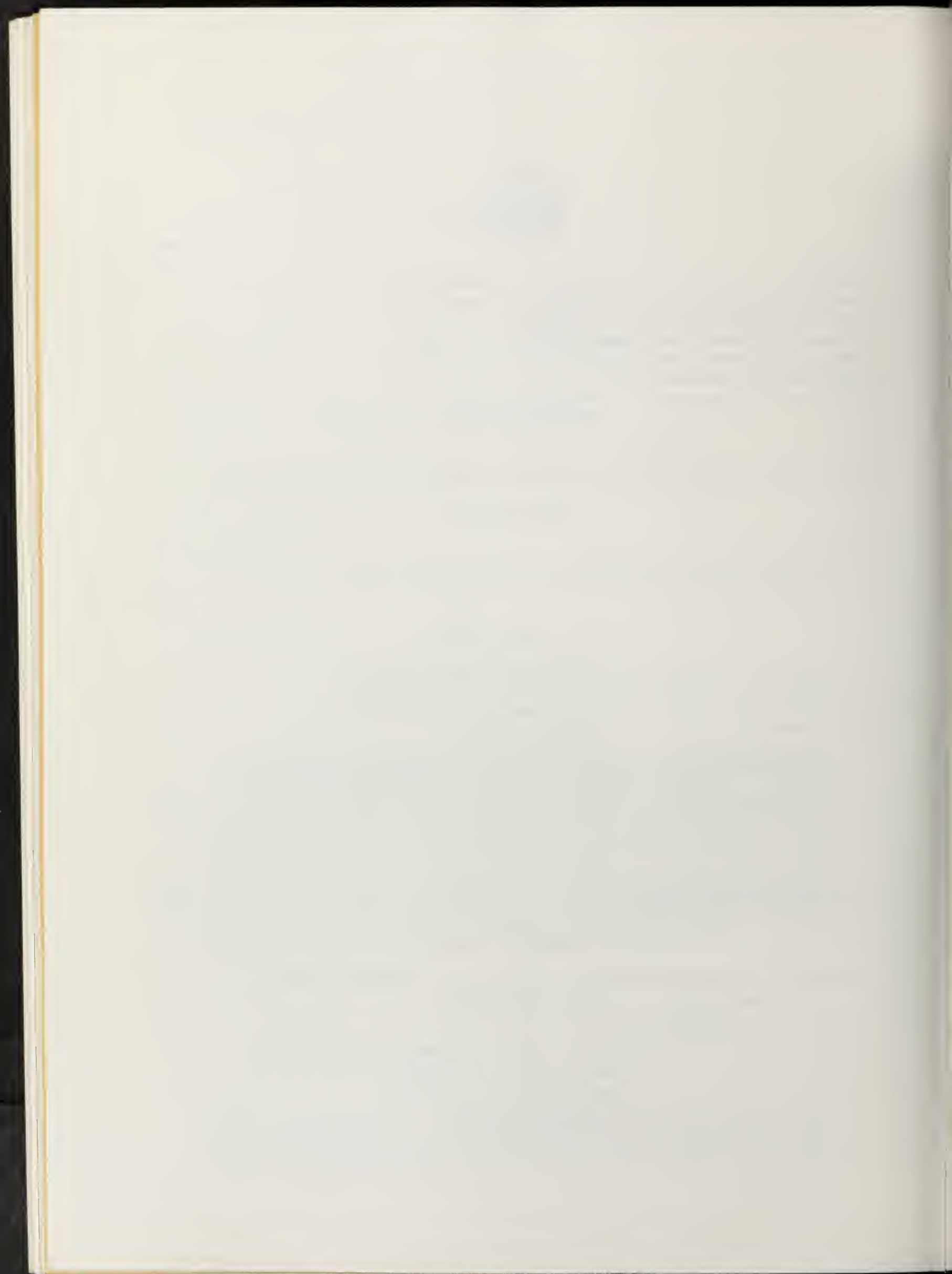
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SYMBOLS USED IN TABLES

- Represents zero or rounds to zero.
 - B Base is less than 75,000.
 - X Not applicable.
-



Child Support and Alimony: 1978 (Advance Report)

HIGHLIGHTS

- Only about three-fifths of the 7.1 million women with children present from an absent father were awarded or had an agreement to receive child support payments in 1978.
- The proportion of women who were awarded child support payments was higher for White women (71 percent) than for Black (29 percent) or Spanish women (44 percent).
- Women with 4 or more years of college were more likely to receive child support payments (86 percent) than women with 4 years of high school (73 percent).
- Of the women who were supposed to receive child support in 1978, 49 percent received the full amount that they were due.
- Only about 14 percent of the 14.3 million ever-divorced or separated women were awarded or had an agreement to receive alimony or maintenance payments.
- As of spring 1979, less than one-half of the 12 million women who had been divorced received some form of property settlement.

INTRODUCTION

Interest in and concern about the adequacy of child support and alimony payments have increased in recent years. These two sources of income take on added importance with the rapid rise of the divorce rate and with the increase in the number of households maintained by women with no husband present. In the past, there were no survey data available which directly addressed the issue of the economic consequences of divorce and separation. The need for this type of survey data was emphasized at the conference on Issues in Federal Statistical Needs Relating to Women, held in the spring of 1978. As a result of the growing demand for these types of data, the Department of Health and Human Services (formerly HEW) and the Department of Commerce jointly funded a special supplement to the April 1979 Current Population Survey (CPS) to collect detailed data on the receipt of child support and alimony payments and on the economic conditions surrounding divorce. For further discussion of the survey design and processing, see "Brief Description of the Survey." A more detailed report containing results from the April 1979 CPS, including a facsimile of the questionnaire used, is scheduled to be published in late 1980 by the Bureau of the Census.

RECIPIENCY OF CHILD SUPPORT, ALIMONY, AND PROPERTY SETTLEMENTS

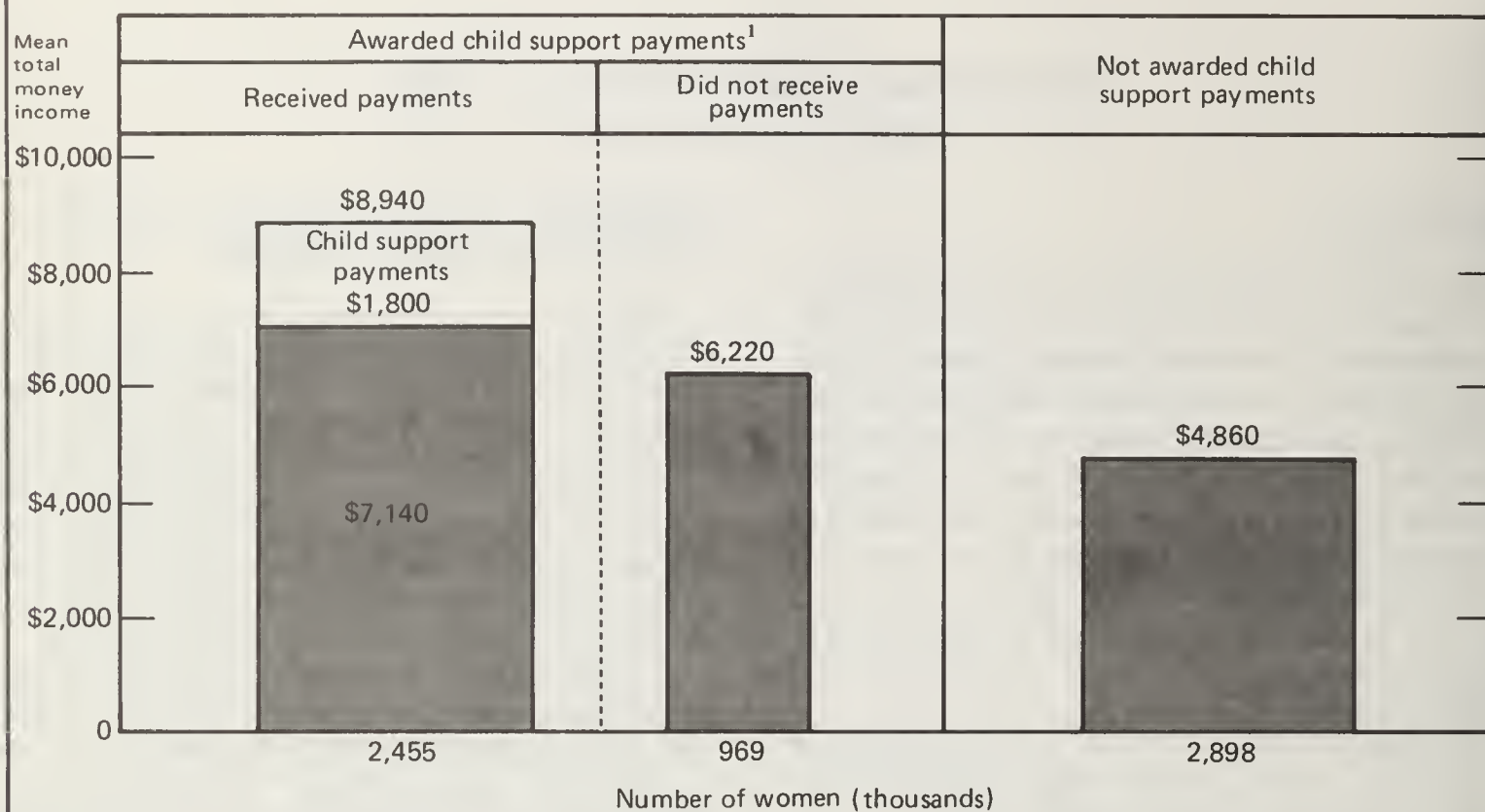
This report presents information on the 7.1 million women at the survey date who had one or more children under 21 years of age who were members of the household but whose father was not. Only about 3.4 million of these women (about one-half) were awarded and were supposed to receive child support payments in 1978. About 10 percent had been awarded but were not supposed to receive payments in 1978 because of a variety of reasons, such as death of a former spouse or children past the age of eligibility for payments. The remaining 41 percent were never awarded payments.

In 1978, almost three-quarters of the women due child support payments actually received them; 49 percent received the full amount and 23 percent received less than they were due. For women who actually received child support, the mean amount received was \$1,800, about 20 percent of their mean total money income (\$8,940). On average, the total money income of women who were due payments but did not receive them was below the mean income of women who received payments, and by an amount greater than the mean child support payment (see the figure). The mean income for women not awarded payments was lower than the average income of those who were due payments, whether or not they were actually received.

Of the 14.3 million ever-divorced or separated women in 1979, only about 2 million (14 percent) were awarded or had an agreement to receive alimony or maintenance payments (table A). Of these women, about 760,000 (a little over one-third) were supposed to receive payments in 1978. Approximately two-thirds (69 percent) of the women due payments actually received them, with an average payment of \$2,850. The mean total money income for women receiving payments (\$11,060) was higher than that for women due payments but not receiving them (\$7,270).

Information on the type and value of property settlements received following divorce was obtained from ever-divorced women (table 4). Property settlements are defined as a house or other real estate, a one-time cash settlement, or other property (for example, cars or furniture). As of spring 1979, less than one-half of the 12 million women who had ever been divorced received some form of property settlement. Table 4 contains distributions of the reported value of the settlement for women divorced during the 1975-79 period. The median settlement value for all women receiving a

Mean Income of Women With Children Under 21 Years of Age Present From an Absent Father: 1978



¹ Excludes a small number of women who were awarded payments but were not supposed to receive them in 1978.

property settlement was \$4,650. The amounts reported in the survey represent the *share* of the house or other property received by women.

CHARACTERISTICS OF WOMEN RECEIVING CHILD SUPPORT

Of the 3.4 million women due payments in 1978, the proportion actually receiving payments and the mean amounts received showed some variation by marital status and race (table B). Only 11 percent of never-married women were awarded payments, compared with 71 percent for all other women. However, once payments were awarded, never-married women were just as likely to receive them as other women. The low percentage of never-married women awarded payments may be due to the difficulty in establishing paternity. However, once paternity is established, it may be likely that child support payments are ordered by the court; such an order might explain the high rate of receipt. Never-married women received, on average, the lowest amount of child support payments (\$980). White women with children from an absent father were much more likely to be awarded child support payments (71 percent) than Black women (29 percent) or women of Spanish origin (44 percent). Of those who were supposed to receive payments in 1978, race and Spanish origin did not seem to be factors in the receipt of payment. However, the mean payment received by White women (\$1,860) was higher than the average payment received by Black women (\$1,290) and those of

Spanish origin (\$1,320), which were not significantly different from each other.

Women who were not high school graduates were much less likely to be awarded child support payments than were women with higher educational attainment. Of those who were supposed to receive payments in 1978, both reciprocity rates and the mean amount of child support received varied positively with years of school completed. Those with 4 or more years of college were more likely to receive payments (86 percent) than were those who had completed only 4 years of high school (73 percent). Of the women actually receiving child support payments, those who had attended 4 or more years of college received higher payments, on the average (\$2,570), than those who had completed only 4 years of high school (\$1,660); they also had higher mean total money incomes (\$16,440) than those with the lower educational attainment (\$7,940). There are several potential explanations for the relationship between educational attainment and both reciprocity rates and average child support payments. In general, there is a positive correlation between the educational attainment of husbands and wives. Since more highly educated husbands are more likely to have higher incomes, they are also more likely to be in a better economic position to provide child support payments. Also, it is possible that more highly educated women are more effective in using the legal system to obtain and assure receipt of support payments. However, the survey design did not allow these hypotheses to be directly tested.

Table A. Reciprocity Status of Women-Child Support and Alimony Payments

(Women as of March 1979. Child support payments for women with own children under 21 years of age present from an absent father; alimony payments for ever-divorced women)

Reciprocity status of women	Child support payments		Alimony payments	
	Number (thousands)	Percent distribution	Number (thousands)	Percent distribution
Total.....	7,094	100.0	14,334	100.0
Awarded.....	4,196	59.1	2,052	14.3
Supposed to receive payments in 1978.....	3,424	48.3	760	5.3
Not supposed to receive payments in 1978.....	772	10.9	1,292	9.0
Not awarded.....	2,898	40.9	12,282	85.7
Supposed to receive payments in 1978.....	3,424	100.0	760	100.0
Actually received payments.....	2,452	71.6	528	69.5
Received full amount.....	1,675	48.9	312	41.1
Received partial amount.....	777	22.7	216	28.4
Did not receive payments.....	971	28.4	232	30.5

Table B. Child Support Payments Awarded and Received-Women With Children Present, by Selected Characteristics

(Women with children under 21 years of age from an absent father as of March 1979)

Characteristics of women	Total (thousands)	Percent awarded child support payments	Supposed to receive child support in 1978			
			Total (thousands)	Actually received child support in 1978		
				Percent	Mean child support	Mean total money income
Total.....	7,094	59.1	3,424	71.7	\$1,799	\$ 8,944
CURRENT MARITAL STATUS						
Married ¹	2,006	77.1	1,145	68.3	1,602	7,187
Divorced.....	2,390	79.8	1,693	73.3	1,951	10,582
Separated.....	1,257	45.1	463	72.6	1,906	8,177
Widowed ²	67	(B)	16	(B)	(B)	(B)
Never married.....	1,374	10.6	107	81.3	976	4,522
RACE AND SPANISH ORIGIN						
White.....	5,085	70.7	2,973	72.9	1,861	9,183
Black.....	1,895	28.8	413	63.0	1,294	7,271
Spanish origin ³	521	43.8	191	65.4	1,318	6,922
YEARS OF SCHOOL COMPLETED						
Less than 12 years.....	2,365	46.3	870	61.4	1,503	6,611
High school: 4 years.....	3,157	63.7	1,650	72.9	1,664	7,937
College: 1 to 3 years..	1,117	68.6	629	76.6	2,089	10,395
4 years or more.....	455	71.0	274	85.8	2,574	16,439

B Base less than 75,000.

¹Remarried women whose previous marriage ended in divorce.

²Widowed women whose previous marriage ended in divorce.

³Persons of Spanish origin may be of any race.

The age of the woman seemed to be a factor in the awarding of child support payments. About 46 percent of the women under 30 years old were awarded payments, while about 67 percent of older women had payments awarded to them. For those women who were awarded payments, age did not seem to be a factor in the receipt of payment, but it was positively associated with the amount received. Women under 30 years of age received an average of \$1,290, while those between 30 and 39 years and those 40 years of age and over received \$1,880 and \$2,240, respectively.

Although the number of children from an absent father did not affect reciprocity, the mean child support payment increased with the number of children. For women with only one child present, the average payment was \$1,290, compared with \$2,000 for women with two children present. Thus, the average payment for women with two children was less than twice that for women with one child. The mean amount rose further (\$2,530) with the presence of three children, but did not show any significant change when four or more children were present.

In 1979, there were 2 million women below the poverty level who were caring for children from an absent father. For these women, the reciprocity rate for those who were supposed to receive child support payments in 1978 was only three-fifths, compared with about three-fourths for the total population. The mean child support for those below the poverty level was \$1,220, which represented about one-third of the average total income of those receiving payments (\$3,540) as compared with one-fifth for all women.

Never-married women below the poverty level were less likely than others to be awarded child support payments. For women in poverty, neither reciprocity nor amount of child support payments differed significantly by race or Spanish origin. Although payment amount appeared to differ with the years of school completed (table 1), the apparent differences were not statistically significant due to the large sampling variability.

As mentioned earlier, the average child support payment for women actually receiving payments was \$1,800 in 1978. For women who were supposed to receive payments in 1978, whether they actually received them or not, the mean amount of child support was \$1,290. Table 2 shows the mean amounts that would have been received if the full amount of payments due had been made. For example, the mean child support income for all women who were supposed to receive payments would have been \$2,000, and they would have had a total money income of \$8,900. The poverty rate for women who were supposed to receive child support payments was 17 percent. If they had received full payment, the rate would not have decreased significantly.

About two-thirds of the women who were supposed to receive child support payments in 1978 had a court-ordered agreement. However, a court order did not seem to be an effective method of ensuring full payment, since only approximately three-eighths of the women with court-ordered payments received the full amount of payment due; about the same proportion received no payment at all. The mean amount received under court-ordered agreement was \$1,090.

Women who were supposed to receive child support payments under a voluntary written agreement fared better than women who were awarded payments by the courts. About 68 percent of the women with voluntary agreements actually received the full amount of payment due and only 12 percent received no payment at all; their mean child support payment was \$1,690, 50 percent higher than for women with a court-ordered agreement. However, the women who received payments under voluntary agreements were in a higher income group, with total incomes averaging \$2,000 more than that for women with court-ordered agreements. There was a small number of women who had neither a court-ordered agreement nor a voluntary written agreement (table 2).

CHARACTERISTICS OF WOMEN RECEIVING ALIMONY

The percentage of women who were awarded or had an agreement to receive alimony or maintenance payments showed little variation by selected characteristics. The most pronounced difference in the likelihood of alimony payments being awarded was between White women (16 percent) and Black women (7 percent). Approximately 13 percent of Spanish women were awarded payments, not significantly different from the percentage for all women.

Reciprocity for women due alimony or maintenance payments in 1978 also varied little according to selected demographic and economic characteristics. The likelihood of White women receiving payments was not significantly different from that of Black women or women of Spanish origin. Age, years of schooling, and presence of own children had little apparent effect on reciprocity (table 3). However, women who were divorced or separated during the 1975-79 period were more likely to receive payments (84 percent) than those whose divorce or separation took place prior to 1975 (54 percent). Surprisingly, the reciprocity rate did not vary significantly for those who worked full time (72 percent), compared with those who did not work at all (65 percent).

About 12 percent of the 2.7 million ever-divorced women with incomes below the poverty level were awarded (or had an agreement to receive) alimony or maintenance payments, about the same as for all women.

CHARACTERISTICS OF WOMEN RECEIVING PROPERTY SETTLEMENTS

The receipt of property settlements also varied for women by selected demographic and socioeconomic characteristics. A higher percentage of currently divorced women (50 percent) reported that they received a property settlement than did remarried women (42 percent) or widows (24 percent) (table 4). White women were more likely to have received a settlement than Black women or women of Spanish origin (47 percent compared with 27 and 29 percent, respectively¹). Receipt of a settlement did not vary greatly by age. Women who had not completed high school were much less likely to receive a property settlement than those

¹ The percentages for Black and Spanish-origin women were not significantly different from one another.

who were high school graduates. The proportion receiving settlements appeared to be associated with the year of divorce; the more recent the year, the more likely that the women reported having received a property settlement.

OTHER DATA ON CHILD SUPPORT AND ALIMONY

Survey data previously available on the receipt of child support and alimony payments were obtained as a byproduct from the Survey of Income and Education (SIE) conducted by the Bureau of the Census in the spring of 1976. Because of the design of the SIE, neither the number of women who were actually supposed to receive payments nor the amount of the payment due could be determined. Because of the questionnaire design, the mean amounts of child support payments actually received could be tabulated only for those women who received no other outside support payments.

In contrast, information was obtained from the April 1979 CPS supplement on both the amounts actually received as well as the amounts due for child support and alimony. Questions concerning the method of payment and the frequency of payments received were asked. Reasons for the irregularity of payments were sought for cases in which full payments were not received. Information on type and value of property settlements of ever-divorced women was also collected.

It should be noted that in the SIE, all child support payments were included in the tabulation. In the CPS, only those payments from the most recent divorce or separation were included. This enabled the collection of detailed information about the most recent divorce or separation, although it undoubtedly missed some payments for the small number of women who received support from multiple sources. Because of the differences in survey design and scope, the data from the SIE and CPS are not strictly comparable. For these and other reasons, the average amount of money received for child support was somewhat lower in the 1979 study than in the 1976 study (\$1,800 versus \$2,430). Likewise, the average amount of alimony payment was lower in the 1979 study than in the 1976 study (\$2,850 versus \$4,120). (The information on child support and alimony collected from the SIE may be found in Current Population Reports, Series P-23, No. 84, *Divorce, Child Custody, and Child Support*.)

The reader should also be aware of the existence of administrative and survey data available from the Social

Security Administration (SSA) concerning women who may have received child support payments as part of their income from Aid to Families with Dependent Children (AFDC). With the enactment of the Child Support Enforcement amendments of 1973 to the Social Security Act, provision was made for AFDC child support payments contributed by the father to be paid directly to the welfare agency and not to the parent with whom the child lives. Thus, it is theoretically possible that if a woman received AFDC income in which the child support payment were included, and if she had no knowledge of the inclusion, the CPS data may show her as receiving no child support payment. For further discussion of Child Support Enforcement with relation to AFDC families, see *Aid to Families with Dependent Children--1975 Recipients Characteristics Study* published by the Office of Research and Statistics, Social Security Administration.

BRIEF DESCRIPTION OF THE SURVEY

The data on child support and alimony were collected in a special supplement to the April 1979 Current Population Survey (CPS). All women 18 years of age and older were within the universe for the supplemental questions. Marital status, divorce history, and the presence of own children under 21 years old determined whether or not a woman was eligible to be asked certain series of questions on child support, alimony, and property settlements.

A data file was created containing all of the supplemental data from the April 1979 CPS as well as the income information from the supplement to the March 1979 CPS. This enabled the data gathered in each survey to be jointly tabulated. The file was created by matching the persons on the March 1979 CPS Supplement file with the persons on the April 1979 CPS Basic file, using only those segments from each (approximately three-fourths of the sample) that were interviewed in both months. The match rate for the relevant unweighted universe for April supplement data was approximately 95 percent. March was chosen as the base month from which demographic characteristics were taken. Each time that a match occurred for which there were April supplement data, this information was added to each person's record. The unmatched April records were discarded. If a supplement had unfilled items, an attempt was made to produce a response using a consistency edit of reported information; if this was not possible, the items were imputed from fully reported cases.

NOTE

In the past the Census Bureau has designated a head of household to serve as the central reference person for the collection and tabulation of data for each member of the household (or family). However, the trend toward recognition of equal status and roles for adult family members makes the term "head" less relevant in the analysis of household and family data. As a result, the Bureau is currently developing new techniques for the enumeration and presentation of data which will eliminate the concept "head." Although the data in this report are based on this concept, methodology for future Census Bureau reports will reflect a gradual movement away from this traditional practice.

Table 1. Child Support Payments Agreed to or Awarded—Women With Children Present, by Selected Characteristics, for All Women and Women Below the Poverty Level in 1978

(WOMEN WITH OWN CHILDREN PRESENT UNDER 21 YEARS OF AGE FROM AN ABSENT FATHER AS OF MARCH 1979. FOR MEANING OF SYMBOLS, SEE TEXT)

SELECTED CHARACTERISTICS	CHIL0 SUPPORT PAYMENTS--													
	AGREEO TO OR AWAROE0											NOT AWAROE0		
	SUPPOSEO TO RECEIVE PAYMENTS IN 1978													
	TOTAL	TOTAL ¹	TOTAL	NUMBER	RECEIVED PAYMENTS		DID NOT RECEIVE PAYMENTS		NUMBER	VALUE	STANO-ARO ERROR			NUMBER	VALUE	STANO-ARO ERROR
					MEAN TOTAL MONEY INCOME	MEAN INCOME FROM CHILO SUPPORT	MEAN TOTAL MONEY INCOME	MEAN TOTAL MONEY INCOME						
	(THOUS.)	(THOUS.)	(THOUS.)	(THOUS.)	VALUE	STANO-ARO ERROR	VALUE	STANO-ARO ERROR	(THOUS.)	(DOL.)	(DOL.)	(THOUS.)	(DOL.)	(DOL.)
ALL WOMEN														
TOTAL	7 094	4 196	3 424	2 455	8 944	227	1 799	58	969	6 216	268	2 898	4 841	138
STANOARO ERROR	147	125	115	100	(X)	(X)	(X)	(X)	66	(X)	(X)	108	(X)	(X)
CURRENT MARITAL STATUS OF WOMAN														
MARRIED ²	2 006	1 547	1 145	782	7 187	400	1 602	95	363	4 587	390	459	4 372	432
DIVORCED	2 390	1 907	1 693	1 241	10 582	323	1 951	83	452	7 837	423	483	7 500	433
SEPARATED	1 257	567	463	336	8 177	528	1 906	182	127	5 425	522	690	4 815	229
WIDOWED ³	67	30	16	8	(B)	(B)	(B)	(B)	8	(B)	(B)	37	(B)	(B)
NEVER-MARRIED	1 374	145	107	87	4 522	473	976	147	20	(B)	(B)	1 230	3 915	157
RACE AND SPANISH ORIGIN OF WOMAN														
WHITE	5 085	3 596	2 973	2 168	9 183	247	1 861	63	805	6 140	299	1 489	5 154	211
BLACK	1 895	546	413	260	7 271	601	1 294	141	154	6 872	659	1 348	4 444	174
SPANISH ORIGIN ⁴	521	228	191	125	6 922	1 149	1 318	257	66	(B)	(B)	292	4 555	608
AGE OF WOMAN														
18 TO 29 YEARS	2 585	1 189	1 024	709	6 927	375	1 286	68	314	4 975	335	1 396	3 762	137
30 TO 39 YEARS	2 654	1 790	1 506	1 106	9 135	313	1 876	90	400	6 152	458	864	5 790	297
40 YEARS AND OVER	1 854	1 217	894	640	10 853	511	2 236	132	254	7 848	557	638	5 917	354
EDUCATIONAL ATTAINMENT OF WOMAN														
LESS THAN 12 YEARS	2 365	1 095	870	534	6 611	476	1 503	105	336	4 507	313	1 270	3 497	137
HIGH SCHOOL: 4 YEARS	3 157	2 012	1 650	1 203	7 937	243	1 664	79	447	6 149	365	1 145	5 252	207
COLLEGE: 1 TO 3 YEARS	1 117	766	629	482	10 395	495	2 089	155	147	8 777	834	352	6 078	45
4 YEARS OR MORE	455	323	274	235	16 439	1 026	2 574	186	39	(B)	(B)	131	10 949	1 26
NUMBER OF OWN CHILDREN														
1 CHILO	3 627	2 002	1 560	1 097	8 507	305	1 288	62	463	7 047	439	1 625	5 077	20
2 CHILDREN	2 100	1 374	1 185	880	9 168	384	1 995	93	305	5 720	427	726	4 584	26
3 CHILDREN	830	513	426	297	9 710	875	2 528	233	129	5 230	601	318	4 605	33
4 CHILDREN OR MORE	537	307	253	181	9 252	709	2 752	280	72	(B)	(B)	230	4 311	29
WOMEN WITH INCOMES BELOW THE POVERTY LEVEL IN 1978														
TOTAL	1 973	752	596	351	3 536	288	1 219	178	245	3 003	379	1 221	2 742	177
STANOARO ERROR	144	89	79	61	(X)	(X)	(X)	(X)	51	(X)	(X)	113	(X)	(X)
CURRENT MARITAL STATUS OF WOMAN														
MARRIED ²	113	62	40	22	(B)	(B)	(B)	(B)	18	(B)	(B)	51	(B)	(B)
DIVORCED	553	388	316	174	3 773	379	1 370	272	141	3 034	453	165	3 331	44
SEPARATED	624	237	191	120	3 634	513	1 186	286	70	(B)	(B)	386	2 970	33
WIDOWED ³	18	10	6	2	(B)	(B)	(B)	(B)	4	(B)	(B)	8	(B)	(B)
NEVER-MARRIED	666	55	43	32	(B)	(B)	(B)	(B)	11	(B)	(B)	611	2 555	21
RACE AND SPANISH ORIGIN OF WOMAN														
WHITE	1 007	535	422	246	3 608	336	1 294	218	176	2 765	456	471	2 581	28
BLACK	944	211	171	105	3 368	551	1 044	301	66	(B)	(B)	734	2 854	27
SPANISH ORIGIN ⁴	213	60	49	29	(B)	(B)	(B)	(B)	20	(B)	(B)	153	3 141	67
AGE OF WOMAN														
18 TO 29 YEARS	936	285	236	128	2 747	416	787	231	108	2 798	517	652	2 435	177
30 TO 39 YEARS	654	296	239	144	4 176	439	1 590	299	95	3 078	652	358	3 162	37
40 YEARS AND OVER	383	172	121	79	3 649	555	1 246	340	42	(B)	(B)	211	2 977	47
EDUCATIONAL ATTAINMENT OF WOMAN														
LESS THAN 12 YEARS	1 099	342	268	137	3 616	427	1 091	245	130	2 872	535	757	2 696	27
HIGH SCHOOL: 4 YEARS	656	315	262	168	3 383	435	1 282	272	95	3 188	580	341	2 709	37
COLLEGE: 1 TO 3 YEARS	194	83	62	42	(B)	(B)	(B)	(B)	20	(B)	(B)	111	3 138	57
4 YEARS OR MORE	23	11	4	4	(B)	(B)	(B)	(B)	-	(B)	(B)	13	(B)	(B)
NUMBER OF OWN CHILDREN														
1 CHILO	800	281	208	114	2 843	416	766	190	94	2 465	597	519	2 285	27
2 CHILDREN	591	244	195	122	3 603	505	1 478	360	72	(B)	(B)	347	2 690	37
3 CHILDREN	299	125	110	65	(B)	(B)	(B)	(B)	45	(B)	(B)	174	3 125	47
4 CHILDREN OR MORE	283	102	83	50	(B)	(B)	(B)	(B)	33	(B)	(B)	181	3 787	47

¹INCLUDES A SMALL NUMBER OF WOMEN WHO WERE NOT SUPPOSED TO RECEIVE PAYMENTS IN 1978. ²REMARIED WOMEN WHOSE PREVIOUS MARRIAGE ENDED IN DIVORCE. ³WIDOWED WOMEN WHOSE PREVIOUS MARRIAGE ENDED IN DIVORCE. ⁴PERSONS OF SPANISH ORIGIN MAY BE OF ANY RACE.

Table 2. Reciprocity of Child Support Income in 1978--Women With Children Present, By Type of Arrangement

NUMBERS IN THOUSANDS. WOMEN WITH OWN CHILDREN PRESENT UNDER 21 YEARS OF AGE FROM AN ABSENT FATHER AS OF MARCH 1979. FOR MEANING OF SYMBOLS, SEE TEXT)

			SUPPOSED TO RECEIVE CHILD SUPPORT PAYMENTS IN 1978							
TYPE OF ARRANGEMENT	NUMBER	STANDARD ERROR	AMOUNT OF PAYMENT DUE IN 1978							
			\$1 TO \$499	\$500 TO \$999	\$1,000 TO \$1,499	\$1,500 TO \$1,999	\$2,000 TO \$2,999	\$3,000 TO \$4,999	\$5,000 TO \$6,999	\$7,000 AND OVER
TOTAL ¹										
PERCENT OF PAYMENTS RECEIVED IN 1978:										
TOTAL	3 424	115	236	641	743	529	640	494	76	64
0.0	971	66	93	241	210	157	181	73	5	10
0.1 TO 24.9	208	31	6	37	42	38	34	32	7	12
25.0 TO 49.9	147	26	10	27	35	32	21	17	3	3
50.0 TO 74.9	268	35	21	32	65	50	44	49	7	-
75.0 TO 99.9	154	27	9	22	39	8	41	27	4	4
100.0 AND OVER	1 675	85	97	281	352	245	318	297	50	36
MEAN INCOME FROM CHILD SUPPORT, DOLLARS.	1 290	(X)	163	451	719	959	1 460	2 676	4 404	(B)
STANDARD ERROR DOLLARS.	47	(X)	17	44	33	54	68	108	384	(B)
MEAN TOTAL MONEY INCOME DOLLARS.	8 172	(X)	4 996	6 611	7 320	7 815	8 096	11 040	18 222	(B)
STANDARD ERROR DOLLARS.	183	(X)	509	399	278	366	366	501	3 030	(B)
NUMBER BELOW POVERTY LEVEL	596	(X)	108	134	115	76	94	61	5	3
STANDARD ERROR	79	(X)	34	38	35	28	32	(B)	(B)	(B)
IF FULL AMOUNT OF PAYMENTS WERE RECEIVED IN 1978:										
MEAN INCOME FROM CHILD SUPPORT, DOLLARS.	2 003	(X)	313	751	1 201	1 714	2 385	3 634	5 591	(B)
STANDARD ERROR DOLLARS.	56	(X)	13	9	7	10	15	35	95	(B)
MEAN TOTAL MONEY INCOME DOLLARS.	8 898	(X)	5 147	6 960	7 813	8 574	9 023	11 997	19 416	(B)
STANDARD ERROR DOLLARS.	186	(X)	509	396	275	357	359	491	2 979	(B)
NUMBER BELOW POVERTY LEVEL	480	(X)	102	115	106	57	66	34	-	-
STANDARD ERROR	71	(X)	33	35	33	(B)	(B)	(B)	-	-
COURT-ORDERED PAYMENTS										
PERCENT OF PAYMENTS RECEIVED IN 1978:										
TOTAL	2 277	97	154	428	497	389	425	301	48	35
0.0	822	61	70	196	177	139	164	61	5	10
0.1 TO 24.9	135	25	6	29	24	20	28	16	7	5
25.0 TO 49.9	120	24	7	26	32	23	19	10	-	3
50.0 TO 74.9	188	29	15	24	48	40	32	24	7	-
75.0 TO 99.9	106	22	7	18	25	7	34	15	-	1
100.0 AND OVER	906	64	49	136	191	160	149	175	28	16
MEAN INCOME FROM CHILD SUPPORT, DOLLARS.	1 088	(X)	147	385	621	879	1 166	2 581	(B)	(B)
STANDARD ERROR DOLLARS.	51	(X)	21	62	41	63	85	148	(B)	(B)
MEAN TOTAL MONEY INCOME DOLLARS.	7 652	(X)	5 333	6 072	7 035	7 720	7 590	10 196	(B)	(B)
STANDARD ERROR DOLLARS.	207	(X)	712	392	347	423	393	639	(B)	(B)
NUMBER BELOW POVERTY LEVEL	406	(X)	69	80	72	48	80	48	5	3
STANDARD ERROR	65	(X)	(B)	29	(B)	(B)	29	(B)	(B)	(B)
IF FULL AMOUNT OF PAYMENTS WERE RECEIVED IN 1978:										
MEAN INCOME FROM CHILD SUPPORT, DOLLARS.	1 941	(X)	325	739	1 204	1 715	2 404	3 625	(B)	(B)
STANDARD ERROR DOLLARS.	67	(X)	15	11	9	12	19	45	(B)	(B)
MEAN TOTAL MONEY INCOME DOLLARS.	8 520	(X)	5 512	6 496	7 625	8 561	8 828	11 241	(B)	(B)
STANDARD ERROR DOLLARS.	211	(X)	711	389	344	413	382	627	(B)	(B)
NUMBER BELOW POVERTY LEVEL	308	(X)	65	63	65	34	54	28	-	-
STANDARD ERROR	57	(X)	(B)	(B)	(B)	(B)	(B)	(B)	-	-
VOLUNTARY WRITTEN AGREEMENT										
PERCENT OF PAYMENTS RECEIVED IN 1978:										
TOTAL	1 032	68	68	187	225	127	198	183	26	18
0.0	124	24	24	43	23	15	14	5	-	-
0.1 TO 24.9	63	(B)	-	3	19	16	6	15	-	5
25.0 TO 49.9	27	(B)	2	1	2	9	3	7	3	-
50.0 TO 74.9	69	(B)	1	5	17	10	10	25	-	-
75.0 TO 99.9	45	(B)	1	4	12	1	7	12	4	3
100.0 AND OVER	704	56	40	131	151	76	158	119	19	10
MEAN INCOME FROM CHILD SUPPORT, DOLLARS.	1 685	(X)	(B)	591	948	1 187	2 056	2 931	(B)	(B)
STANDARD ERROR DOLLARS.	95	(X)	(B)	43	52	98	82	140	(B)	(B)
MEAN TOTAL MONEY INCOME DOLLARS.	9 478	(X)	(B)	8 287	8 154	8 186	9 373	12 543	(B)	(B)
STANDARD ERROR DOLLARS.	383	(X)	(B)	996	486	779	796	809	(B)	(B)
NUMBER BELOW POVERTY LEVEL	150	(X)	34	39	33	21	13	10	-	-
STANDARD ERROR	40	(X)	(B)	(B)	(B)	(B)	(B)	(B)	-	-
IF FULL AMOUNT OF PAYMENTS WERE RECEIVED IN 1978:										
MEAN INCOME FROM CHILD SUPPORT, DOLLARS.	2 099	(X)	(B)	769	1 202	1 710	2 348	3 640	(B)	(B)
STANDARD ERROR DOLLARS.	104	(X)	(B)	16	14	22	27	57	(B)	(B)
MEAN TOTAL MONEY INCOME DOLLARS.	9 897	(X)	(B)	8 473	8 424	8 712	9 665	13 252	(B)	(B)
STANDARD ERROR DOLLARS.	390	(X)	(B)	993	479	762	796	793	(B)	(B)
NUMBER BELOW POVERTY LEVEL	132	(X)	32	38	32	17	10	3	-	-
STANDARD ERROR	37	(X)	(B)	(B)	(B)	(B)	(B)	(B)	-	-

¹INCLUDES A SMALL NUMBER OF WOMEN WHO RECEIVED PAYMENTS BY 'SOME OTHER METHOD,' NOT SHOWN SEPARATELY.

Table 3. Alimony or Maintenance Payments Agreed to or Awarded—Ever-Divorced or Separated Women, by Selected Characteristics of All Women and Women With Incomes Below the Poverty Level in 1978

(WOMEN AS OF MARCH 1979. FOR MEANING OF SYMBOLS, SEE TEXT)

SELECTED CHARACTERISTICS	ALIMONY OR MAINTENANCE PAYMENTS--															
	AGREED TO OR AWARDED											NOT AWARDED				
	SUPPOSED TO RECEIVE PAYMENTS IN 1978															
	RECEIVED PAYMENTS														DID NOT RECEIVE PAYMENTS	
	TOTAL	TOTAL ¹	TOTAL	NUMBER	MEAN TOTAL MONEY INCOME	STANDARD ERROR	MEAN INCOME FROM ALIMONY OR MAIN.	STANDARD ERROR	NUMBER	MEAN TOTAL MONEY INCOME	STANDARD ERROR				NUMBER	MEAN TOTAL MONEY INCOME	STANDARD ERROR
(THOUS.)	(THOUS.)	(THOUS.)	(THOUS.)	(DOL.)	(DOL.)	(DOL.)	(DOL.)	(THOUS.)	(DOL.)	(DOL.)	(THOUS.)	(DOL.)	(DOL.)			
ALL WOMEN																
TOTAL	14 334	2 052	760	528	11 061	625	2 851	251	232	7 273	682	12 282	6 401	86		
STANDARD ERROR	142	93	58	49	(X)	(X)	(X)	(X)	33	(X)	(X)	152	(X)	(X)		
CURRENT MARITAL STATUS OF WOMAN																
MARRIED ²	5 758	835	146	74	(B)	(B)	(B)	(B)	71	(B)	(B)	4 924	4 954	134		
WIDOWED ³	955	119	7	5	(B)	(B)	(B)	(B)	2	(B)	(B)	836	5 772	305		
DIVORCED	5 311	859	473	339	12 685	839	3 162	335	135	8 612	937	4 452	8 426	148		
SEPARATED	2 309	240	134	110	8 959	1 100	2 327	466	24	(B)	(B)	2 070	5 740	162		
RACE AND SPANISH ORIGIN OF WOMAN																
WHITE	11 936	1 870	686	486	11 532	663	3 041	267	200	7 315	751	10 066	6 521	98		
BLACK	2 208	165	72	41	(B)	(B)	(B)	(B)	31	(B)	(B)	2 043	5 869	189		
SPANISH ORIGIN ⁴	780	98	43	25	(B)	(B)	(B)	(B)	19	(B)	(B)	682	4 896	446		
AGE OF WOMAN																
18 TO 29 YEARS	2 832	243	128	97	9 079	2 001	1 225	291	31	(B)	(B)	2 589	5 888	152		
30 TO 39 YEARS	3 851	553	243	155	11 016	960	2 583	361	88	7 524	1 302	3 298	7 295	173		
40 YEARS AND OVER	7 651	1 256	389	276	11 785	791	3 575	406	113	7 101	921	6 395	6 147	124		
EDUCATIONAL ATTAINMENT OF WOMAN																
LESS THAN 12 YEARS	5 128	638	188	119	7 419	1 737	1 772	355	68	(B)	(B)	4 489	4 039	86		
HIGH SCHOOL: 4 YEARS	5 920	839	301	205	10 030	680	2 274	291	96	6 030	852	5 081	6 639	122		
COLLEGE: 1 TO 3 YEARS	2 101	351	168	120	12 131	989	4 472	709	48	(B)	(B)	1 750	8 331	246		
4 YEARS OR MORE	1 185	223	104	83	17 290	1 670	3 489	711	20	(B)	(B)	962	12 655	495		
PRESENCE OF OWN CHILDREN																
NO CHILDREN PRESENT	8 614	1 294	347	242	8 825	746	3 224	441	105	6 227	871	7 320	6 123	113		
1 OR MORE CHILDREN PRESENT	5 720	758	413	286	12 951	929	2 536	271	127	8 138	1 000	4 961	6 810	132		
YEAR OF DIVORCE OR SEPARATION																
1975 AND LATER	4 813	646	396	331	10 862	703	2 938	338	66	(B)	(B)	4 167	7 067	135		
1970 TO 1974	3 282	472	200	130	12 755	1 645	2 742	454	70	(B)	(B)	2 809	6 786	189		
1960 TO 1969	3 064	463	120	47	(B)	(B)	(B)	(B)	73	(B)	(B)	2 601	6 389	193		
BEFORE 1960	3 175	470	43	19	(B)	(B)	(B)	(B)	24	(B)	(B)	2 705	4 984	184		
WORK EXPERIENCE IN 1978 OF WOMAN																
WORKED	9 258	1 259	533	380	12 513	621	2 716	269	153	9 337	896	7 999	8 449	106		
WORKED AT FULL-TIME JOBS	7 324	956	420	304	12 916	683	2 319	277	115	10 579	1 016	6 368	9 441	117		
50 TO 52 WEEKS	5 031	647	277	197	15 582	773	2 783	383	80	12 237	1 210	4 384	11 084	135		
WORKED AT PART-TIME JOBS	1 934	303	113	76	10 892	1 438	4 307	687	37	(B)	(B)	1 632	4 580	179		
DID NOT WORK	5 076	794	227	148	7 325	1 451	3 200	566	80	3 314	499	4 282	2 573	93		
WOMEN WITH INCOMES BELOW THE POVERTY LEVEL IN 1978																
TOTAL	2 747	325	124	71	(B)	(B)	(B)	(B)	53	(B)	(B)	2 422	2 543	116		
STANDARD ERROR	169	59	36	(B)	(X)	(X)	(X)	(X)	(B)	(X)	(X)	159	(X)	(X)		
CURRENT MARITAL STATUS OF WOMAN																
MARRIED ²	366	61	6	-	(B)	(B)	(B)	(B)	6	(B)	(B)	305	962	254		
WIDOWED ³	244	14	3	1	(B)	(B)	(B)	(B)	2	(B)	(B)	230	2 430	234		
DIVORCED	1 114	166	66	40	(B)	(B)	(B)	(B)	26	(B)	(B)	948	2 757	178		
SEPARATED	1 024	84	49	30	(B)	(B)	(B)	(B)	19	(B)	(B)	939	2 869	190		
RACE AND SPANISH ORIGIN OF WOMAN																
WHITE	1 860	270	96	54	(B)	(B)	(B)	(B)	43	(B)	(B)	1 590	2 342	141		
BLACK	856	53	27	18	(B)	(B)	(B)	(B)	9	(B)	(B)	803	2 961	195		
SPANISH ORIGIN ⁴	236	26	7	-	(B)	(B)	(B)	(B)	7	(B)	(B)	209	2 770	613		
AGE OF WOMAN																
18 TO 29 YEARS	657	46	25	18	(B)	(B)	(B)	(B)	7	(B)	(B)	610	2 436	205		
30 TO 39 YEARS	725	83	41	23	(B)	(B)	(B)	(B)	18	(B)	(B)	641	3 095	261		
40 YEARS AND OVER	1 366	196	59	31	(B)	(B)	(B)	(B)	28	(B)	(B)	1 170	2 297	145		
PRESENCE OF OWN CHILDREN																
NO CHILDREN PRESENT	1 440	204	52	33	(B)	(B)	(B)	(B)	18	(B)	(B)	1 236	1 994	121		
1 OR MORE CHILDREN PRESENT	1 308	122	72	38	(B)	(B)	(B)	(B)	34	(B)	(B)	1 186	3 115	181		

¹INCLUDES A SMALL NUMBER OF WOMEN WHO WERE NOT SUPPOSED TO RECEIVE PAYMENTS IN 1978. ²REMARIED WOMEN WHOSE PREVIOUS MARRIAGE ENDED IN DIVORCE. ³WIDOWED WOMEN WHOSE PREVIOUS MARRIAGE ENDED IN DIVORCE. ⁴PERSONS OF SPANISH ORIGIN MAY BE OF ANY RACE.

Table 4. Property Settlement Following Divorce—Ever-Divorced Women, by Selected Characteristics

NUMBERS IN THOUSANDS. WOMEN AS OF MARCH 1979. FOR MEANING OF SYMBOLS, SEE TEXT)

SELECTED CHARACTERISTICS	TOTAL	NO SETTLE- MENT REACHED	PROPERTY SETTLEMENT REACHED							
			TOTAL	HOUSE ONLY ¹	CASH ONLY ²	OTHER PROPERTY ONLY ³	HOUSE AND CASH	HOUSE AND OTHER PROPERTY	CASH AND OTHER PROPERTY	HOUSE, CASH, AND OTHER PROPERTY
TOTAL	12 025	6 675	5 350	616	417	2 060	32	1 417	545	263
STANDARD ERROR	153	145	136	53	44	93	(B)	78	50	35
CURRENT MARITAL STATUS OF WOMAN										
DIVORCED	5 311	2 636	2 675	323	193	962	7	771	267	151
REMARRIED ⁴	5 758	3 311	2 447	239	206	1 016	23	587	270	106
WIDOWED ⁵	955	728	227	54	18	81	2	59	8	5
RACE AND SPANISH ORIGIN OF WOMAN										
WHITE	10 568	5 635	4 933	570	383	1 940	31	1 287	475	247
BLACK	1 307	951	355	41	30	91	-	118	61	15
SPANISH ORIGIN ⁶	548	388	160	34	12	68	-	33	10	3
AGE OF WOMAN										
UNDER 29 YEARS	2 067	1 165	902	13	55	593	2	133	88	17
30 TO 39 YEARS	3 273	1 587	1 686	153	131	708	13	433	175	73
40 YEARS AND OVER	6 684	3 922	2 762	450	231	758	17	851	282	173
EDUCATIONAL ATTAINMENT OF WOMAN										
LESS THAN 12 YEARS	4 000	2 706	1 294	178	117	508	5	349	99	37
HIGH SCHOOL: 4 YEARS	5 114	2 596	2 518	255	175	1 015	7	696	253	116
COLLEGE: 1 TO 3 YEARS	1 849	930	919	114	60	363	8	195	119	60
4 YEARS OR MORE	1 062	443	619	69	65	174	11	177	73	50
YEAR OF DIVORCE										
1975 AND LATER	3 529	1 606	1 924	131	137	829	11	520	210	86
1970 TO 1974	2 871	1 526	1 345	139	99	550	11	326	165	56
1960 TO 1969	2 754	1 546	1 208	273	101	408	5	271	116	34
BEFORE 1960	2 870	1 997	873	73	81	273	4	301	55	87
VALUE OF SETTLEMENT ⁷										
TOTAL	(X)	(X)	1 924	131	137	829	11	520	210	86
VALUE REPORTED	(X)	(X)	1 672	103	115	706	9	475	190	74
UNDER \$5,000	(X)	(X)	899	31	72	593	6	107	75	15
\$5,000 TO \$9,999	(X)	(X)	263	11	17	81	-	91	52	12
\$10,000 TO \$19,999	(X)	(X)	244	23	19	20	2	119	45	14
\$20,000 TO \$29,999	(X)	(X)	94	17	2	5	1	60	5	3
\$30,000 TO \$39,999	(X)	(X)	108	12	2	5	-	77	5	8
\$40,000 TO \$49,999	(X)	(X)	63	9	2	2	-	20	7	23
\$50,000 AND OVER	(X)	(X)								
MEDIAN VALUE DOLLARS . .	(X)	(X)	4 647	14 334	3 982	2 978	(B)	13 284	6 863	(B)
STANDARD ERROR DOLLARS . .	(X)	(X)	180	3 484	588	178	(B)	1 446	1 045	(B)
DO NOT KNOW VALUE	(X)	(X)	252	28	22	123	2	45	20	12

¹THE HOUSE OR OTHER REAL ESTATE.²A ONE-TIME CASH SETTLEMENT.³OTHER PROPERTY (CARS, FURNISHINGS, ETC.).⁴REMARRIED WOMEN WHOSE PREVIOUS MARRIAGE ENDED IN DIVORCE.⁵WIDOWED WOMEN WHOSE PREVIOUS MARRIAGE ENDED IN DIVORCE.⁶PERSONS OF SPANISH ORIGIN MAY BE OF ANY RACE.⁷RESTRICTED TO WOMEN WHO WERE DIVORCED IN 1975 AND LATER.

Appendix A. Definitions and Explanations

Money income. Data on income collected in the CPS are limited to money income received before payments for personal income taxes and deductions for Social Security, union dues, Medicare premiums, etc. Money income is the sum of the amounts received from earnings (including losses which occurred among the self-employed from their own farm or nonfarm operations); Social Security and public assistance payments; Supplemental Security income; dividends, interest, and rent (including losses); unemployment and worker's compensation; government and private employee pensions; and other periodic income. (Certain money receipts such as capital gains are not included.) Therefore, money income does not reflect the fact that many families receive part of their income in the form of nonmoney transfers such as food stamps, health benefits, and subsidized housing; that many farm families receive nonmoney income in the form of rent-free housing and goods produced and consumed on the farm; or that nonmoney incomes are also received by some nonfarm residents such as the use of business transportation and facilities, full or partial payments by business for retirement programs, medical and educational expenses, etc. These elements should be considered when comparing income levels.

As in most household surveys, the estimated total amount of income received by persons derived from the March CPS is somewhat less than estimated amounts derived from independent sources such as the Bureau of Economic Analysis, the Social Security Administration, and Veterans' Administration. The difference between the survey estimate and the independent estimate is termed "underreporting." Underreporting tends to be more pronounced for income sources that are not derived from earnings, such as Social Security, public assistance, and net income from interest, dividends, rentals, etc. Overall, income earned from wages or salary is

much better reported than other sources of income and, when dollar imputations are assigned for nonreporting, total wage and salary income approximates independently derived estimates. By contrast, 1978 income data (both reported and allocated) for Social Security and public assistance payments to beneficiaries were approximately 94 and 76 percent, respectively, of independently derived estimates. For further details, see Current Population Reports, Series P-60, No. 123.

Poverty (low-income) classification. Families and unrelated individuals are classified as being above or below the poverty level using the poverty index adopted by a Federal Interagency Committee in 1969. This index is based on the Department of Agriculture's 1961 Economy Food Plan and reflects the different consumption requirements of families based on their size and composition, sex and age of the family head, and farm-nonfarm residence. It was determined from the Department of Agriculture's 1955 survey of food consumption that families of three or more persons spend approximately one-third of their income on food; the poverty level for these families was, therefore, set at three times the cost of the economy food plan. For smaller families and persons living alone, the cost of the economy food plan was multiplied by factors that were slightly higher in order to compensate for the relatively larger fixed expenses of these smaller households. The poverty thresholds are updated every year to reflect changes in the Consumer Price Index (CPI). The poverty threshold for a nonfarm family of four was \$6,662 in 1978, about 7.6 percent higher than the comparable 1977 cutoff of \$6,191. For further details, see Current Population Reports, Series P-60, No. 124.

Symbols. A dash (—) represents zero or rounds to zero, and the symbol "B" means that the base is less than 75,000. An "X" means not applicable.

Appendix B. Source and Reliability of the Estimates

SOURCE OF DATA

The estimates in this report are based on data collected in March and April of 1979 from the Current Population Survey (CPS) conducted by the Bureau of the Census. The present CPS sample was initially selected from the 1970 census file and is updated continuously to reflect new construction where possible. The sample was spread over 614 areas with coverage in each of the 50 States and the District of Columbia.

In the March sample, approximately 56,000 occupied households were eligible for interview. Interviews were not obtained at about 3,000 of these occupied units because the occupants were not found at home after repeated calls or were unavailable for some other reason. In addition to the 56,000 occupied units, about 10,000 sample addresses were visited but found to be vacant or otherwise ineligible for interview.

About 40,000 of the households interviewed in March were interviewed again in April. Women 18 years of age and older were asked supplemental questions regarding child support and alimony payments. These responses were successfully matched to the March responses for 37,033 of the 40,981 eligible women who were interviewed in March.¹ Child support and alimony information was imputed for the other 3,948 eligible women. The table below gives sample sizes and imputation rates by marital status.

Sample Size and Imputation Rates

Marital status	Sample size	Imputed cases	Rate
Total.....	40,981	3,948	9.6
Married or widowed....	30,473	2,420	7.9
Divorced.....	2,686	488	18.2
Separated.....	1,119	233	20.8
Never married.....	6,703	807	12.0

The estimation procedure used in this survey involves the deflation of weighted sample results to independent estimates of the civilian noninstitutional population of the United States by age, race, and sex. These independent estimates are based on statistics from decennial censuses; statistics on births, deaths, immigration, and emigration; and statistics on the strength of the Armed Forces.

¹ The main reasons why responses were not obtained for all eligible women interviewed in March are families who have relocated and April nonresponse.

RELIABILITY OF THE ESTIMATES

Since the estimates in this report are based on a sample, they may differ somewhat from the figures that would have been obtained if a complete census had been taken using the same schedules, instructions, and enumerators. There are two types of errors possible in an estimate based on a sample survey—sampling and nonsampling. The standard errors provided for this report primarily indicate the magnitude of the sampling error. They also partially measure the effect of some nonsampling errors in response and enumeration, but do not measure any systematic biases in the data. The full extent of the nonsampling error is unknown. Consequently, particular care should be exercised in the interpretation of figures based on a relatively small number of cases or on small differences between estimates.

Nonsampling variability. Nonsampling errors in surveys can be attributed to many sources, e.g., inability to obtain information about all cases in the sample, definitional difficulties, differences in the interpretation of questions, inability or unwillingness of respondents to provide correct information, inability to recall information, errors made in collection such as in recording or coding the data, errors made in processing the data, errors made in imputing values for missed data, and failure to represent all sample households and persons within sample households (undercoverage).

Sampling variability. The standard errors given in this report are primarily measures of sampling variability, that is, of the variations that occurred by chance because a sample rather than the whole of the population was surveyed. The sample estimate and its estimated standard error enable one to construct interval estimates that include the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under identical conditions and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples;
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples;

3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

The average result of all possible samples may or may not be contained in any particular computed interval. However, for a particular sample one can say with specified confidence that the average result of all possible samples is included within the constructed interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors. This means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have a level of a significance between 1.6 and 2.0 standard errors.

Note when using small estimates. Percent distributions are shown in the report only when the base of the percentage is 75,000 or greater. Because of the large standard errors involved, there is little chance that percentages would reveal useful information when computed on a smaller base. Estimated totals are shown, however, even though the relative standard errors of these totals are larger than those for corresponding percentages. These smaller estimates are provided primarily to permit such combinations of the categories as serve each user's needs.

Standard errors. Standard errors of estimates for those characteristics of greatest interest are given together with these estimates in tables 1 through 4. Standard errors for the other estimates can be computed directly by the user as outlined in the next section.

Computation of standard errors for estimated numbers and estimated percentages. Standard errors of estimated numbers

and estimated percentages can be computed directly with formulae (1) and (2) below, respectively. The formulae are:

$$\sigma_x = \sqrt{ax^2 + bx} \quad (1)$$

Here x is the size of the estimate and a and b are the parameters associated with the characteristic.

$$\sigma_{(x,p)} = \sqrt{\frac{b}{x} \cdot p \cdot (100 - p)} \quad (2)$$

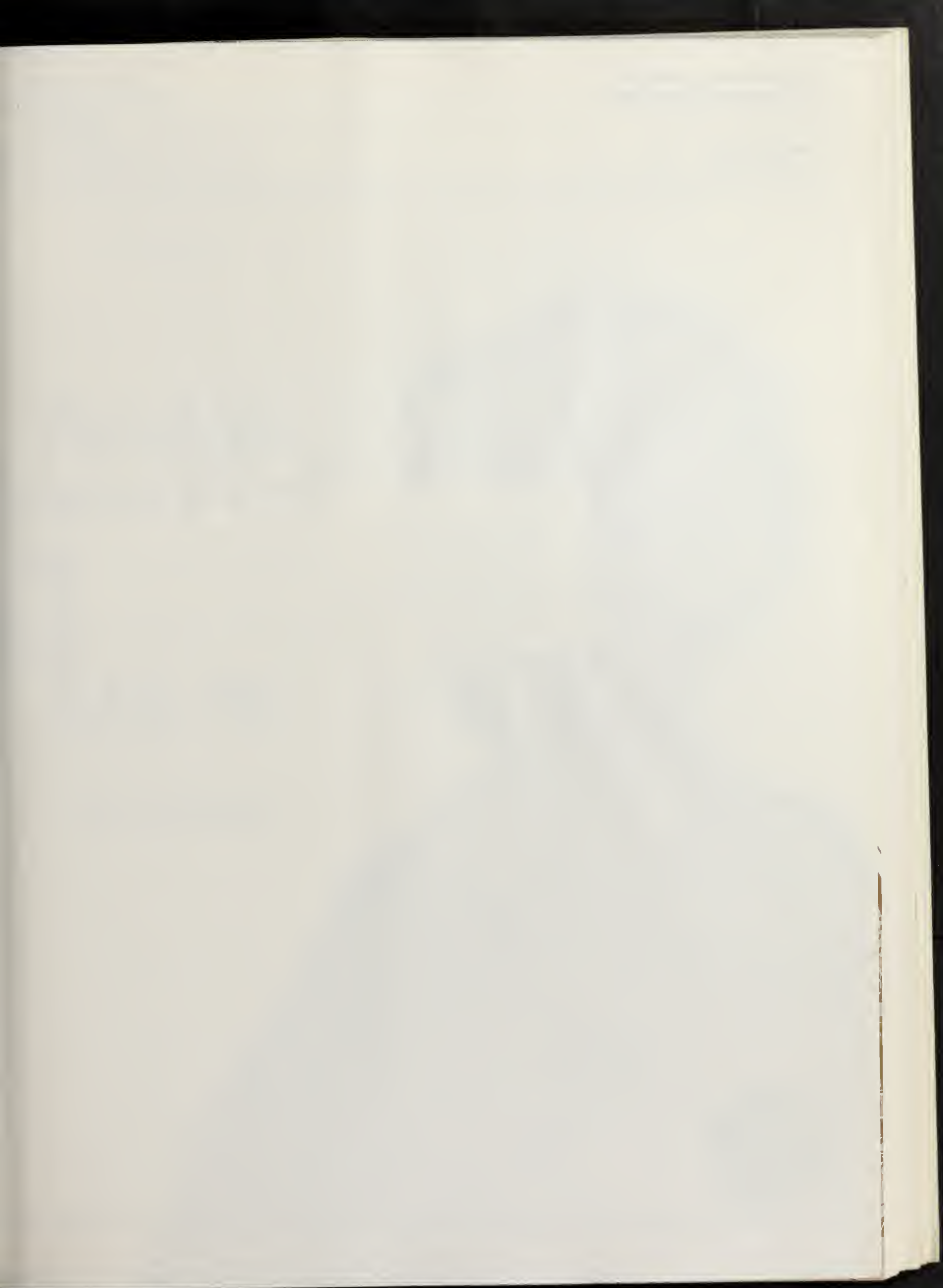
Here x is the size of the subclass of the population which is the base of the percentage, p is the percentage ($0 < p < 100$), and b is the parameter associated with the characteristic.

Table B-1 provides the values of the a and b parameters that are used in formulae (1) and (2) to create standard errors of estimated number of persons and estimated percentages.

Table B-1. Parameters To Be Used in the Computation of Standard Errors for Estimated Numbers and Percentages of Persons

Characteristics	Parameters ¹	
	a	b
Total women:		
Total or White.....	-.000227	4,667
Black.....	-.000280	6,693
Spanish origin.....	-.000112	9,959
Women from income levels below poverty:		
Total or White.....	-.000080	10,595
Black.....	-.000677	10,595
Spanish origin.....	-.000276	25,904

¹These parameters should not be used to calculate standard errors for estimates which are given in dollars (e.g., mean income).



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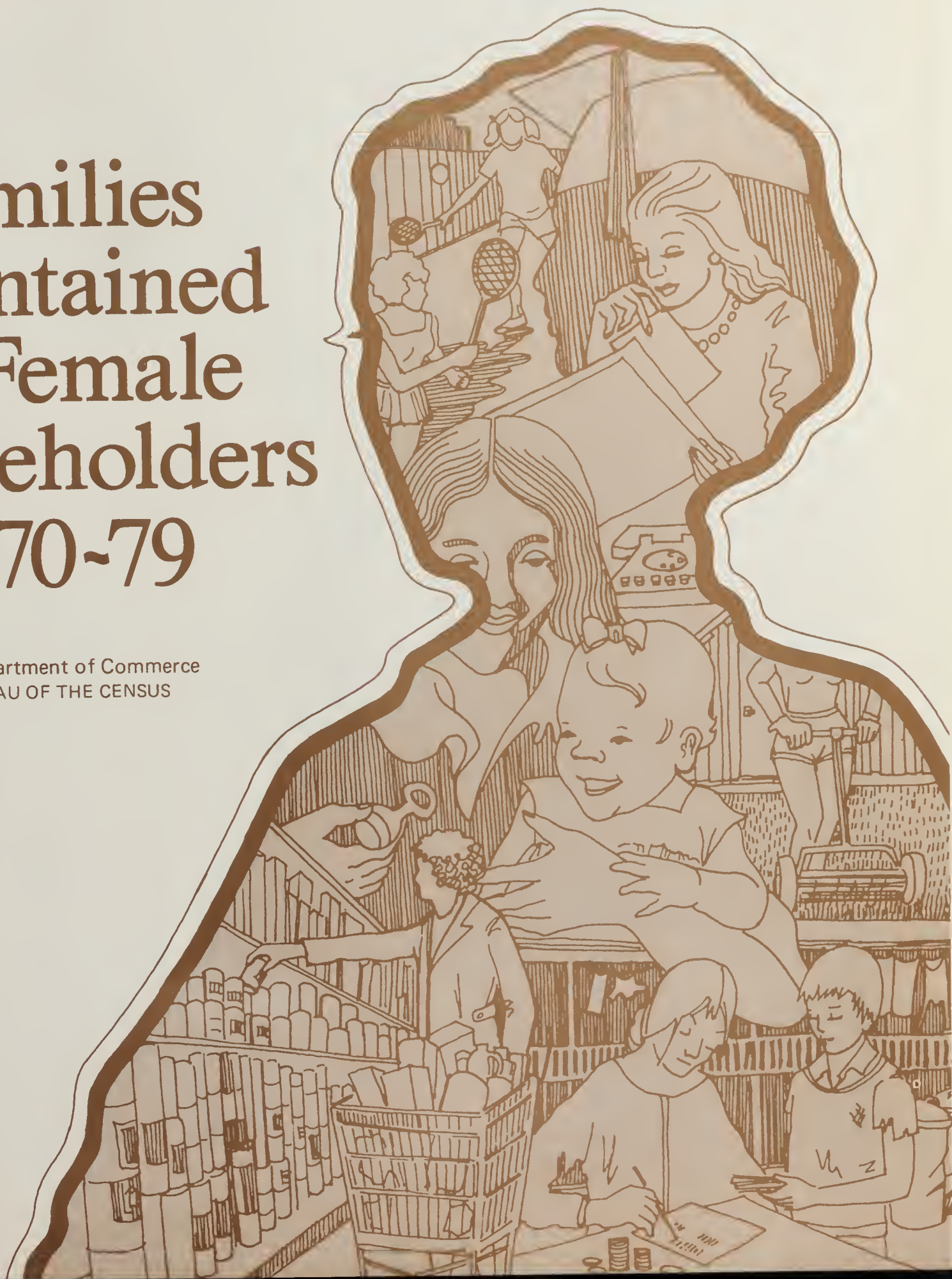


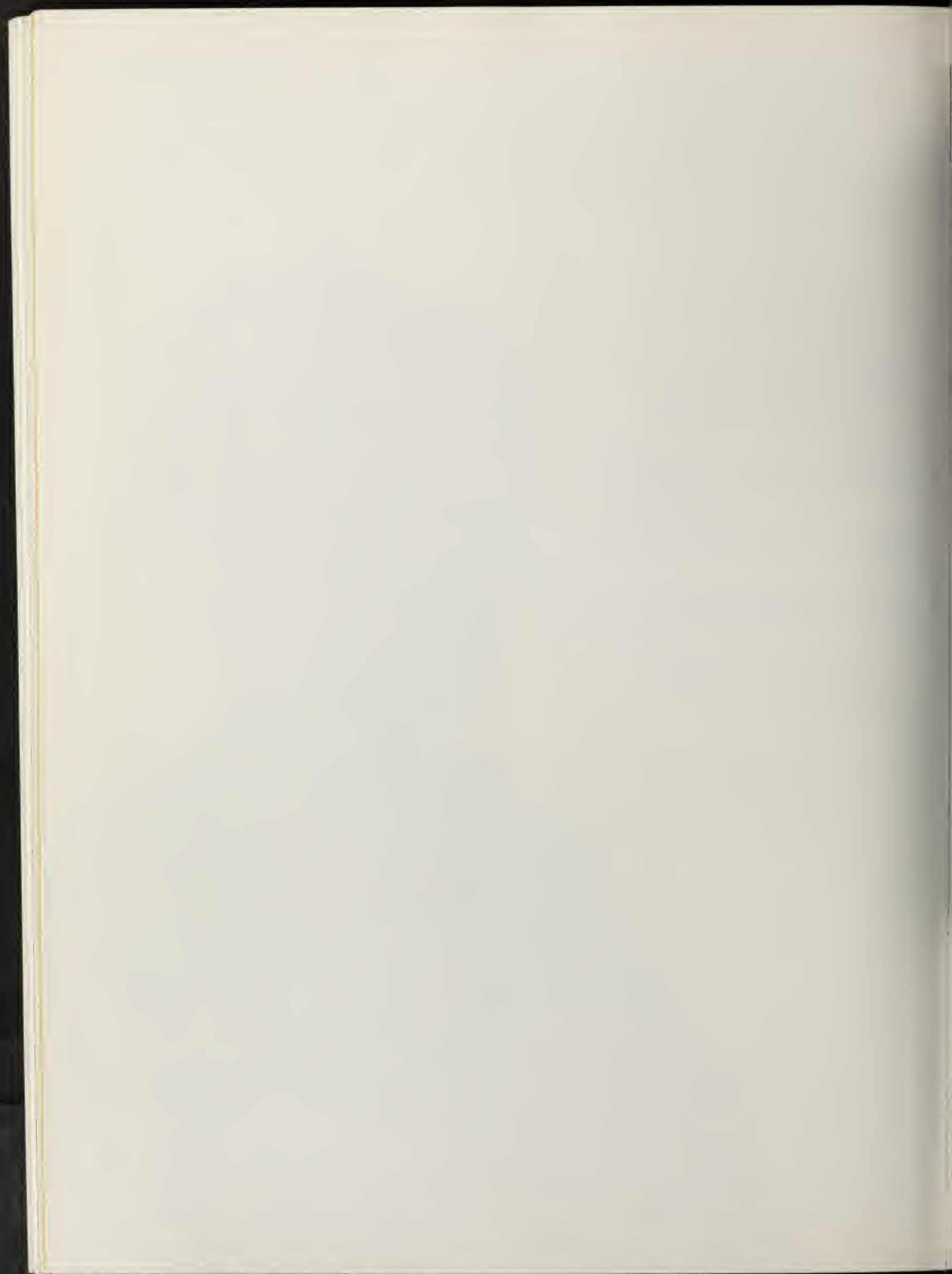
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Families Maintained by Female Householders 1970-79

U.S. Department of Commerce
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Special Studies
Series P-23, No. 107

Issued October 1980

Families Maintained by Female Householders 1970-79

by
Steve W. Rawlings



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ACKNOWLEDGMENTS

The author extends his sincere thanks to each of those individuals in Population Division, Publications Services Division, and Statistical Methods Division whose often considerable efforts contributed to the completion of this report.

Library of Congress Cataloging in Publication Data

Rawlings, Stephen, 1945-
Families maintained by female householders, 1970
to 1979.

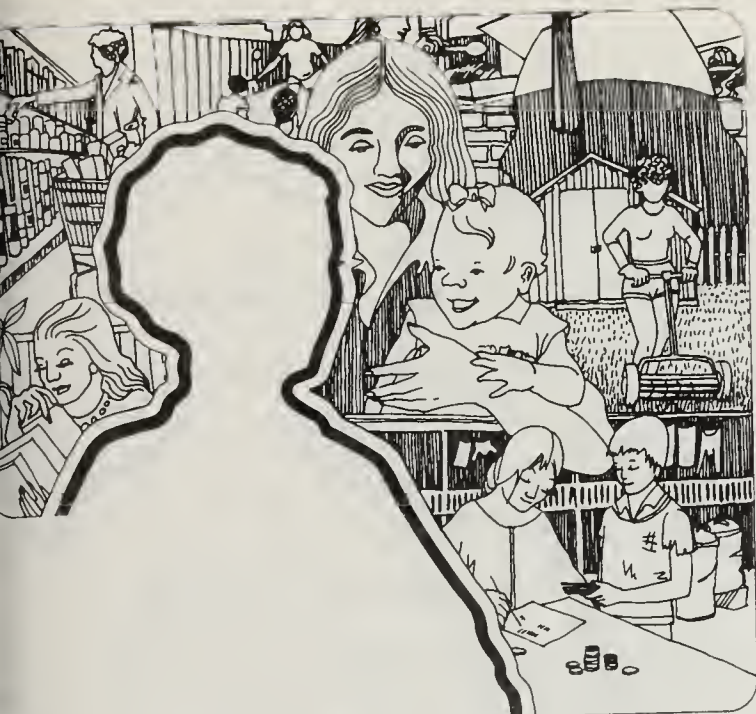
(Current population reports : Special Studies :
Series P-23 ; no. 107)

1. Single-parent family—United States—Statistics.
 2. Women heads of households—United States—Statistics.
- I. United States. Bureau of the Census. II. Title.
III. Series: United States. Bureau of the Census.
Current population reports ; Special studies : Series
P-23 ; no. 107.

HA203.A218 no. 107 [HQ536] 312'.0973s [306.8]

80-25731

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SYMBOLS USED IN TABLES

- Represents zero or rounds to zero.
 - B Base is less than 75,000.
 - X Not applicable.
 - NA Not available.
-



Introduction

.When people talk about the vitality of *the family*, they often are referring to a traditional nuclear family comprised of a married couple with at least one child. There are, however, other types of family groups, and strict adherence to this narrow definition of the family excludes a significant proportion of people who actually live in families.

Over the past two decades, the Census Bureau has documented the especially large increase in the number of one of these alternative family types: families maintained by women with no husband present. In 1974, the Bureau issued a special report devoted to what were then referred to as "female family heads." That study included data primarily for the 1960-73 period. This year's report provides new information for the decade of the 1970's on female householders and their families.

The Census Bureau is moving toward the elimination of terminology such as "head of household" and "head of family," recognizing that many households and families are no longer organized in accordance with autocratic principles. Roles now overlap or are shared, and decision-making within the family is often distributed on a more equitable basis.

This report focuses on the sort of family living units that the Bureau once called "female-headed families." The new terminology, however, is "families maintained by female householders with no husband present." During the 1970's, this type of family had a higher rate of growth than any other type. Various factors contributed to this phenomenon: childbearing outside marriage; the dissolution of nuclear families through separation, divorce, or widowhood; the inclination and ability of women to establish or maintain independent families rather than residing with parents or other relatives as they might have done at one time; and the disproportionate population increase in the young adult ages.

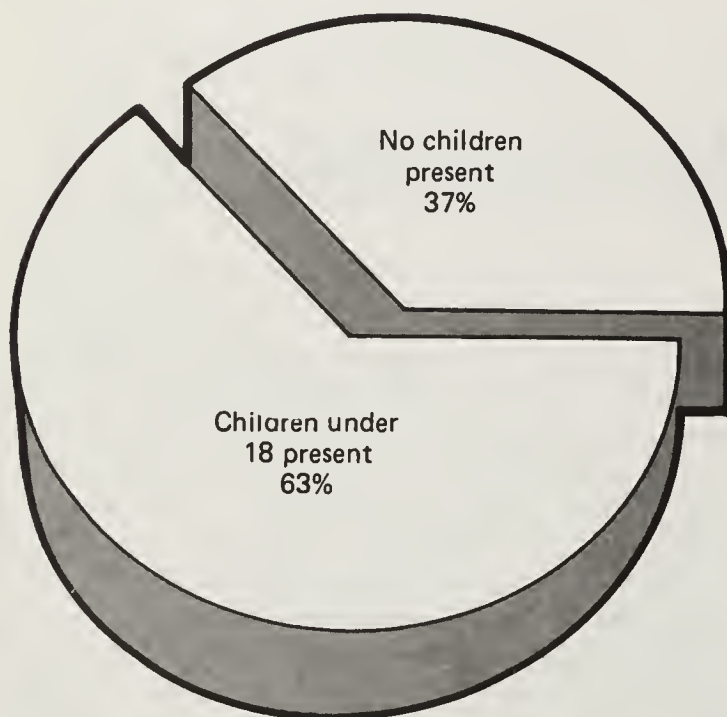
Although the strength of the family today as compared

with other points in the past is debatable, the institution of the family is still the major conduit for transmitting social values and distributing economic benefits. Families maintained by female householders, particularly those with children, tend to suffer financial hardships due to the absence of an earner who either has been or could be a major income contributor. This situation makes it difficult for these families to secure their fair share of the Nation's economic pie. Even if a female householder is a full-time worker, she probably earns less than a comparable male worker and her family's income is not likely to be supplemented with the earnings of a second income recipient. Especially perilous is the economic security of those families maintained by women who have never worked outside the home, dropped out of the labor force years ago to be full-time mothers, or only worked part time. When large numbers of families have found it difficult to fulfill their traditional responsibilities, public programs have been devised to ameliorate the attendant social and economic difficulties. The emergence of large numbers of female-householder families, a majority of which are one-parent situations, has enlarged the pool of families which may require the attention and assistance of policymakers.

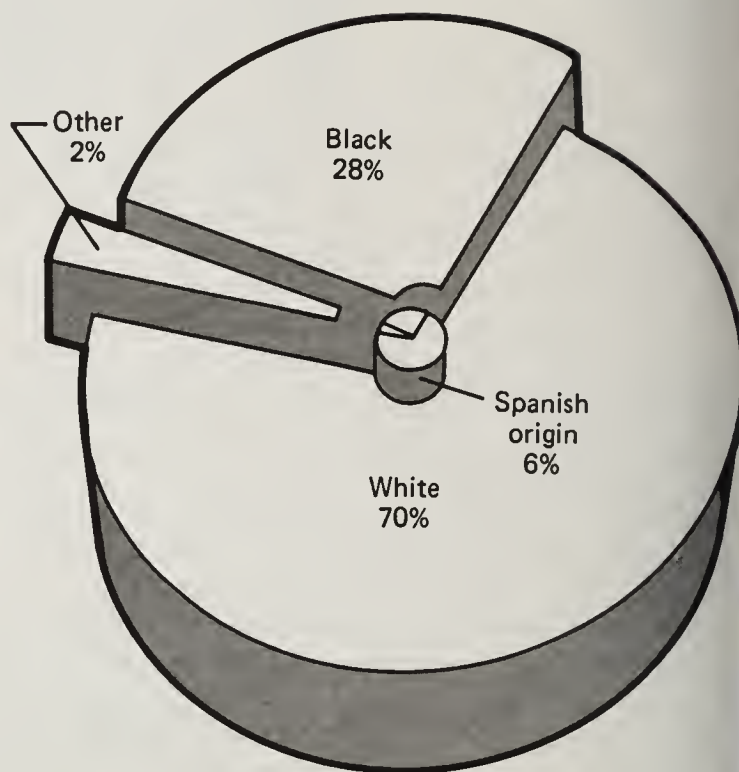
This report presents a compilation of data describing changes between 1970 and 1979 in families maintained by women with no husband present. Included is information relating to characteristics such as age, race, Spanish origin, number and age of children, place of residence, marital status, education, employment status, occupation, mobility, and income. (See the following charts.) Most of the data are from the Census Bureau's Current Population Survey. Since the figures are estimates based on samples of the population, they are subject to sampling variability, which is relatively large for small numbers. A full statement about the sampling variability is presented in Appendix B, "Source and Reliability of the Estimates."

A Profile of the 8.5 Million Families Maintained by Female Householders in 1979

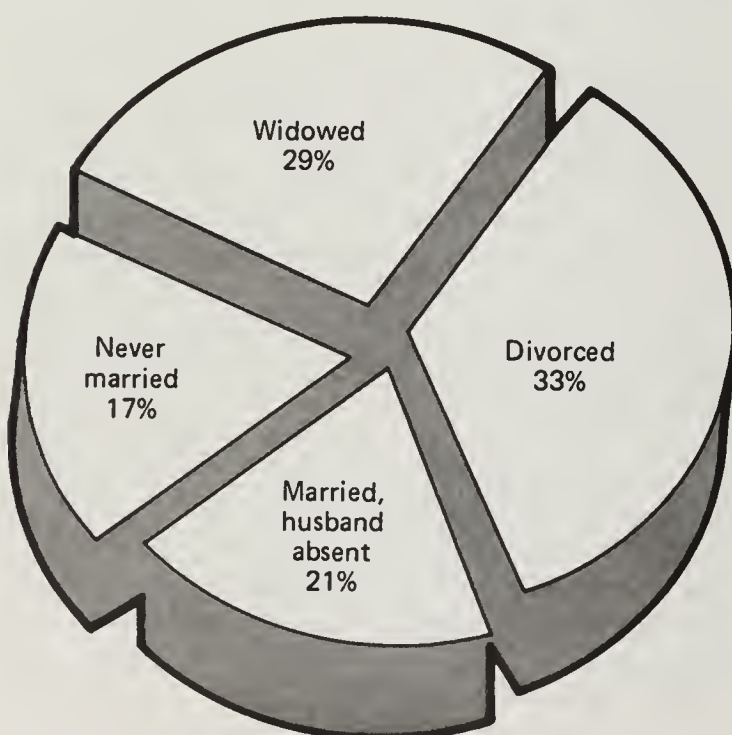
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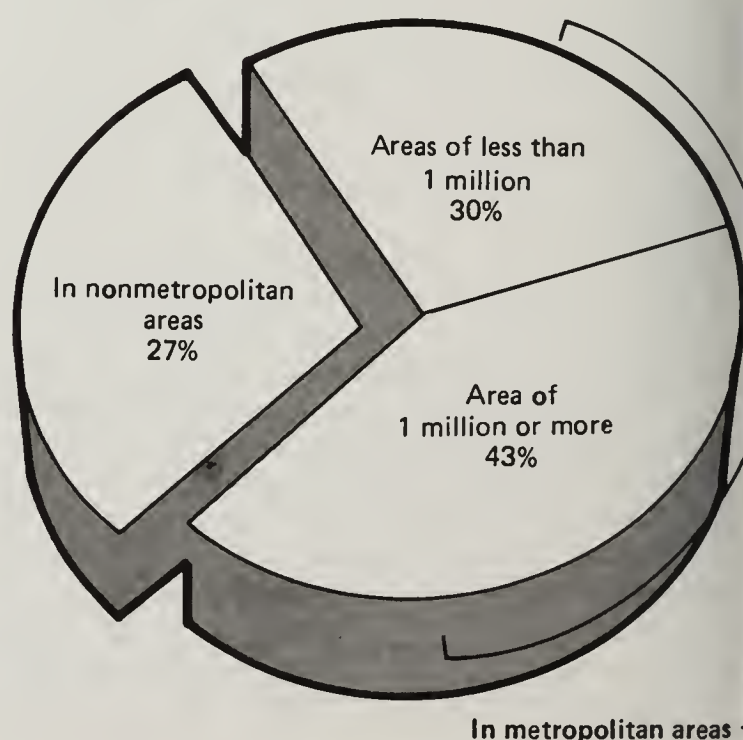
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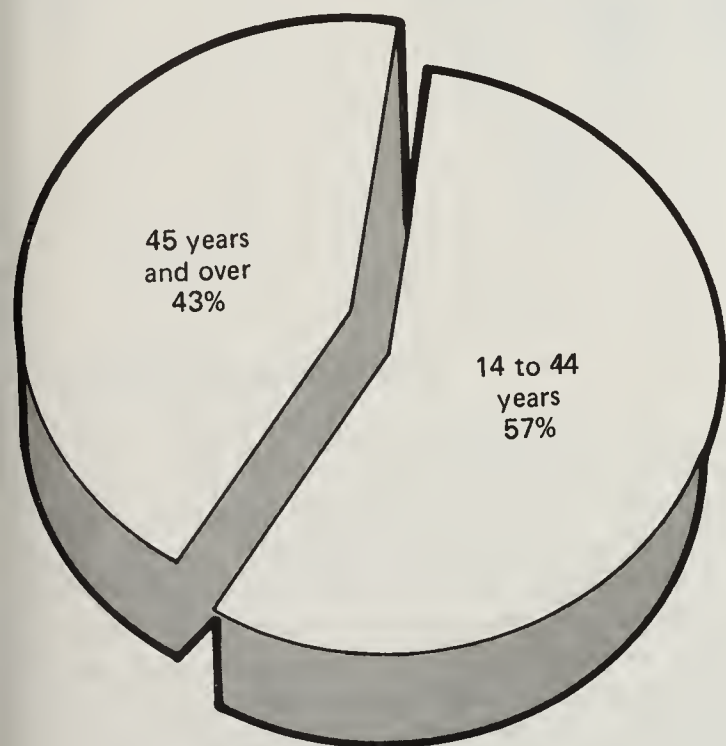
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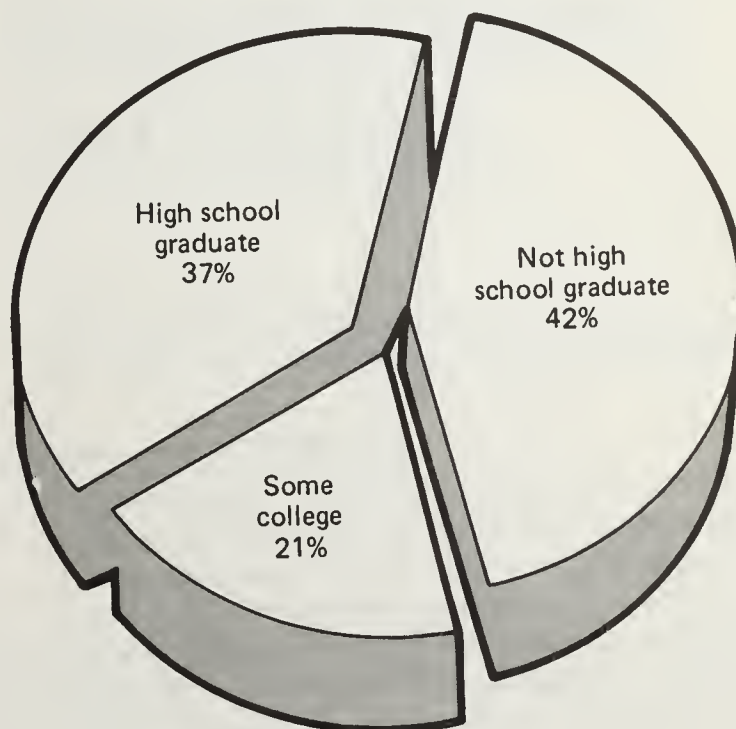
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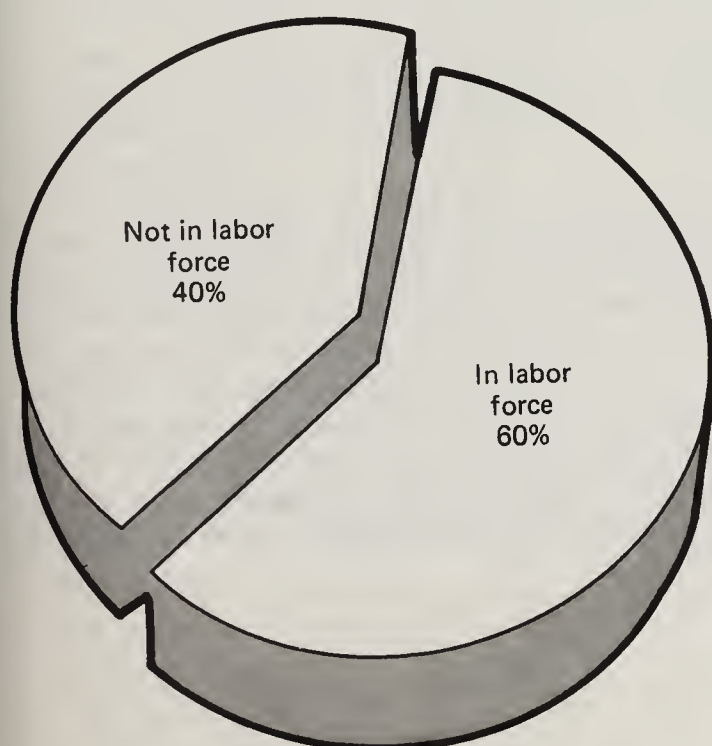
Age



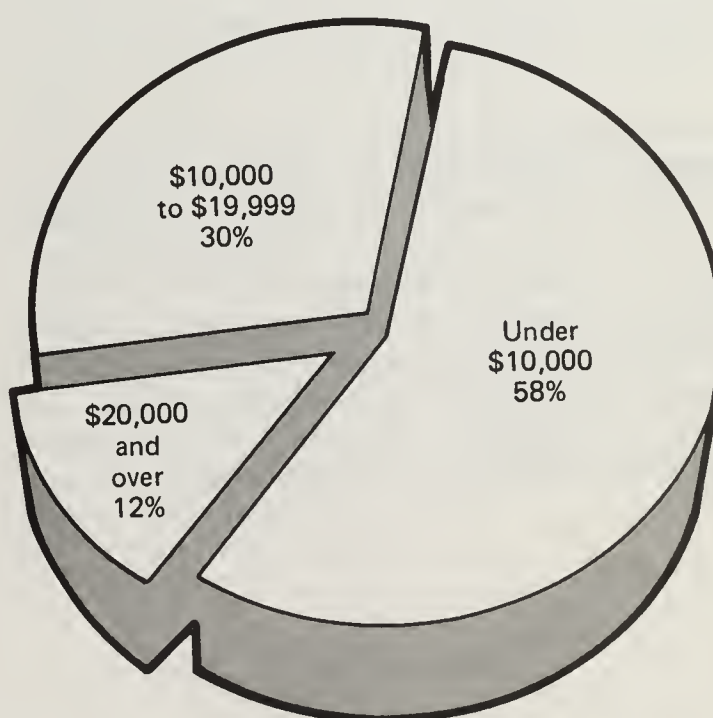
Education

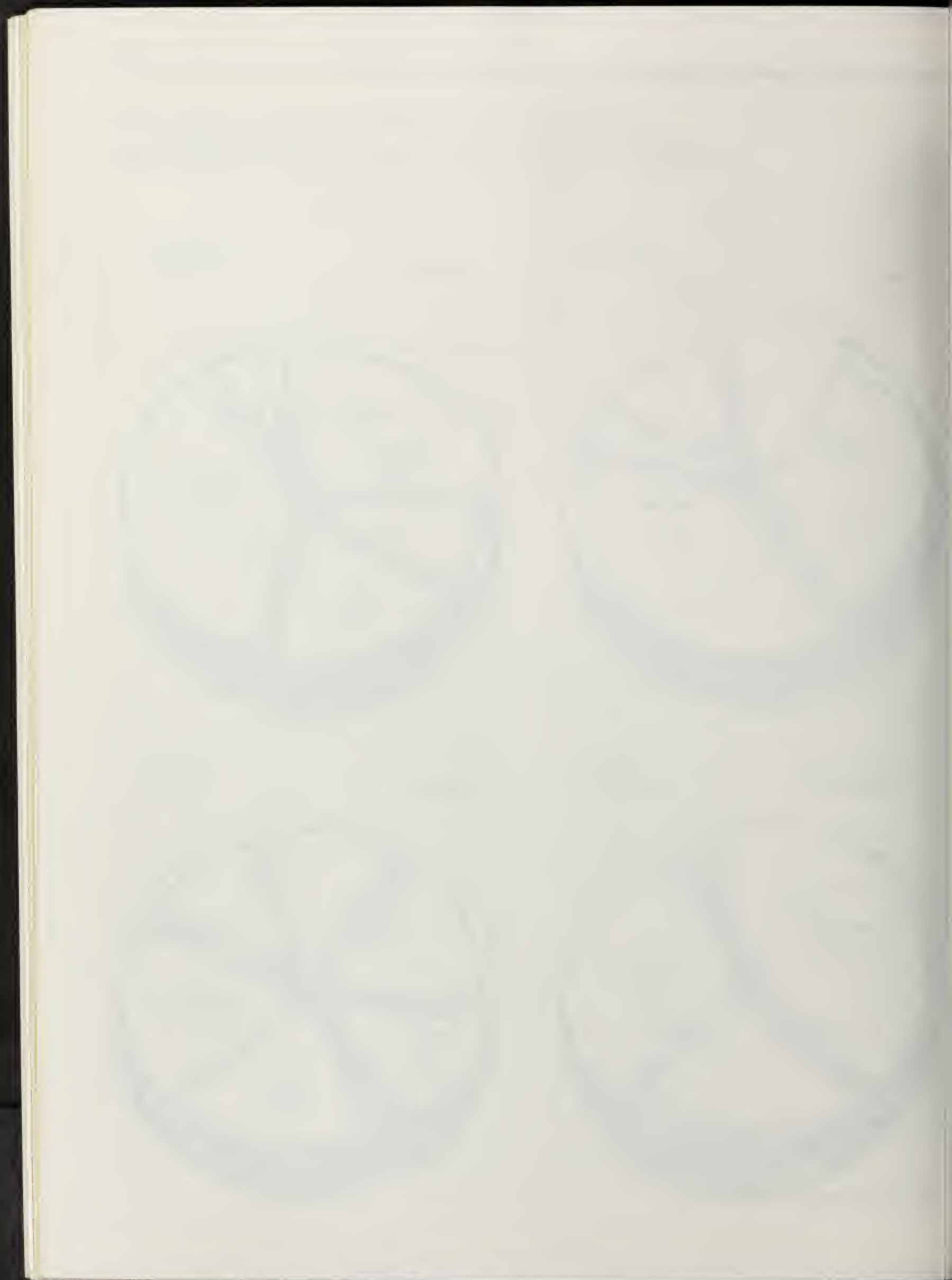


Labor Force Participation



Income







Female Householders in Context

LIVING ARRANGEMENTS

Before discussing female householders in more detail, it might be helpful to examine the full range of women's living arrangements. The vast majority of women live in family settings, although the proportion in families has declined slightly since 1970. In 1979, 55 percent of women 14 years old and over were living with their husbands, 10 percent were maintaining a family or subfamily without a husband, and 20 percent were living in some other family situation (usually with their parents); the corresponding proportions at the beginning of the decade were 59 percent, 8 percent, and 21 percent, respectively (table 1).

About 16 percent of women 14 years old and over in 1979 were not living in family households, up from 12 percent in 1970. Most of these women lived alone. The proportion of women living with persons to whom they were not related by birth, marriage, or adoption was 3.6 percent in 1979, compared with 2.3 percent in 1970. This group of women included, among others, female partners in unmarried-couple households.

Women 35 to 44 years old were the most likely to reside in family households. By contrast, women 75 years old and older were most likely to be living in nonfamily households, generally because these women continue to maintain their own homes after their families have dissolved (usually due to the deaths of their husbands).

Women without husbands living in a family setting with one or more of their own children present are likely to be younger than comparable women living in families with no children present. In 1979, about 83 percent of those with

children were under age 45, while only 14 percent of those without children at home were in that age group (table 2).

FAMILY COMPOSITION

The increase in the number of families maintained by female householders was one of the most dramatic changes in the composition of family units during the 1970's. While the total number of families increased by 12 percent between 1970 and 1979, the number maintained by female householders grew by 51 percent (table 3). Even more striking was the 81-percent increase in the number of householders who were mothers with one or more of their children present in the home (table 4).

Due to their high rate of growth, female householders constituted 15 percent of the total number of families in 1979, up from 11 percent of the 1970 total. Among families with children under 18 present, 17 percent were maintained by the mother alone in 1979, compared with 10 percent in 1970.

Among Whites, 12 percent of all families were maintained by female householders in 1979. By contrast, 41 percent of Black families and 20 percent of Spanish-origin families were maintained by women.

Not all female householders are mothers living with children in households where the husband is not present. People sometimes use statistics on female householders as if they were synonymous with "single-parent" situations. In fact, only 5.3 million (63 percent) of the 8.5 million families maintained by women in 1979 were single-parent (mother-child) families.

Table 1. Age of Women, by Living Arrangements: 1979 and 1970

(Does not include inmates of institutions. Numbers in thousands. For meaning of symbols, see text)

Age of women	All women 14 years and over		Women in families								Women not in families			
			Total	Living with husband			Not living with husband ¹			Others	Total	Living alone	Living with nonrelatives	
	Number	Percent		Total	In own household	Others	Total	Children present	No children				In own household	Others
1979														
Total, 14 years and over	88,617	100.0	84.3	54.5	53.8	0.7	10.0	6.5	3.6	19.8	15.7	12.1	1.2	2.4
14 to 24 years.....	22,308	100.0	90.2	22.8	21.9	0.9	4.4	3.9	0.4	63.0	9.8	3.4	1.7	4.7
25 to 34 years.....	17,334	100.0	89.3	70.5	69.5	1.0	13.3	12.7	0.7	5.5	10.7	6.2	1.6	2.8
35 to 44 years.....	12,671	100.0	94.1	76.5	75.9	0.5	15.0	13.1	1.9	2.6	5.9	4.1	0.6	1.3
45 to 54 years.....	11,790	100.0	91.3	75.4	75.0	0.5	13.1	6.9	6.2	2.8	8.7	7.1	0.4	1.3
55 to 64 years.....	10,887	100.0	80.1	67.4	67.0	0.4	8.9	1.4	7.5	3.8	19.9	18.0	0.7	1.2
65 to 74 years.....	8,382	100.0	62.1	46.9	46.3	0.5	8.4	0.1	8.4	6.8	37.9	35.4	1.3	1.2
75 years and over.....	5,245	100.0	47.7	20.9	20.6	0.3	9.2	0.1	9.2	17.5	52.3	50.0	1.2	1.0
1970														
Total, 14 years and over	76,841	100.0	88.1	59.1	58.2	0.9	7.9	4.4	3.5	21.1	11.9	9.5	0.7	1.6
14 to 24 years.....	19,741	100.0	95.3	28.7	27.0	1.7	3.3	3.0	0.3	63.4	4.7	1.4	0.7	2.5
25 to 34 years.....	12,617	100.0	95.3	81.9	81.1	0.9	8.5	8.2	0.3	4.9	4.7	2.8	0.6	1.3
35 to 44 years.....	11,814	100.0	96.3	83.3	82.8	0.5	9.8	8.4	1.3	3.2	3.7	2.6	0.2	0.8
45 to 54 years.....	11,938	100.0	92.0	78.7	78.1	0.5	9.6	5.6	3.9	3.8	8.0	6.6	0.5	0.9
55 to 64 years.....	9,703	100.0	80.0	64.5	64.1	0.4	9.6	1.2	8.4	6.0	20.0	17.3	1.1	1.6
65 to 74 years.....	6,823	100.0	64.6	44.4	43.8	0.7	9.4	0.1	9.2	10.8	35.4	32.3	1.4	1.7
75 years and over.....	4,204	100.0	55.7	20.8	20.4	0.4	11.7	-	11.7	23.2	44.3	40.3	1.6	2.5

¹Includes female householders and women maintaining subfamilies (i.e., related subfamilies) and secondary families (i.e., unrelated subfamilies).**Table 2. Living Arrangements of Women, by Age: 1979 and 1970**

(Does not include inmates of institutions. Numbers in thousands. For meaning of symbols, see text)

Age of women	All women 14 years and over	Women in families								Women not in families			
		Total	Living with husband			Not living with husband ¹			Others	Total	Living alone	Living with nonrelatives	
			Total	In own household	Others	Total	Children present	No children				In own household	Others
1979													
Total, 14 years and over	88,617	74,721	48,257	47,662	595	8,889	5,719	3,170	17,575	13,896	10,738	1,029	2,129
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
14 to 24 years.....	25.2	26.9	10.5	10.3	32.9	10.9	15.4	2.9	80.0	15.7	7.0	36.9	49.5
25 to 34 years.....	19.6	20.7	25.3	25.3	28.4	26.0	38.4	3.6	5.4	13.3	10.0	27.7	22.9
35 to 44 years.....	14.3	16.0	20.1	20.2	10.9	21.4	29.1	7.4	1.9	5.4	4.8	7.4	7.5
45 to 54 years.....	13.3	14.4	18.4	18.5	9.4	17.3	14.2	23.1	1.9	7.4	7.8	4.3	7.0
55 to 64 years.....	12.3	11.7	15.2	15.3	8.1	10.9	2.7	25.6	2.3	15.6	18.3	7.3	6.0
65 to 74 years.....	9.5	7.0	8.1	8.1	7.2	8.0	0.2	22.1	3.2	22.8	27.7	10.2	4.7
75 years and over.....	5.9	3.3	2.3	2.3	2.9	5.5	0.1	15.2	5.2	19.7	24.4	6.2	2.6
1970													
Total, 14 years and over	76,841	67,717	45,397	44,728	669	6,075	3,409	2,665	16,245	9,123	7,319	565	1,240
Percent.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
14 to 24 years.....	25.7	27.8	12.5	11.9	49.2	10.7	17.1	2.4	77.0	10.1	3.9	25.7	40.2
25 to 34 years.....	16.4	17.8	22.8	22.9	16.3	17.7	30.3	1.5	3.8	6.5	4.9	12.9	12.8
35 to 44 years.....	15.4	16.8	21.7	21.9	8.7	19.0	29.3	5.8	2.4	4.8	4.3	5.0	7.8
45 to 54 years.....	15.5	16.2	20.7	20.9	9.6	18.8	19.7	17.6	2.8	10.5	10.8	9.6	9.0
55 to 64 years.....	12.6	11.5	13.8	13.9	6.4	15.3	3.3	30.6	3.6	21.3	23.0	18.8	12.3
65 to 74 years.....	8.9	6.5	6.7	6.7	6.9	10.6	0.3	23.7	4.5	26.5	30.1	16.5	9.6
75 years and over.....	5.5	3.5	1.9	1.9	2.7	8.1	-	18.4	6.0	20.4	23.1	11.9	8.3

¹Includes female householders and women maintaining subfamilies (i.e., related subfamilies) and secondary families (i.e., unrelated subfamilies).

Table 3. Number of Families, by Type, Race, and Spanish Origin of Householder: 1979 and 1970
(Numbers in thousands).

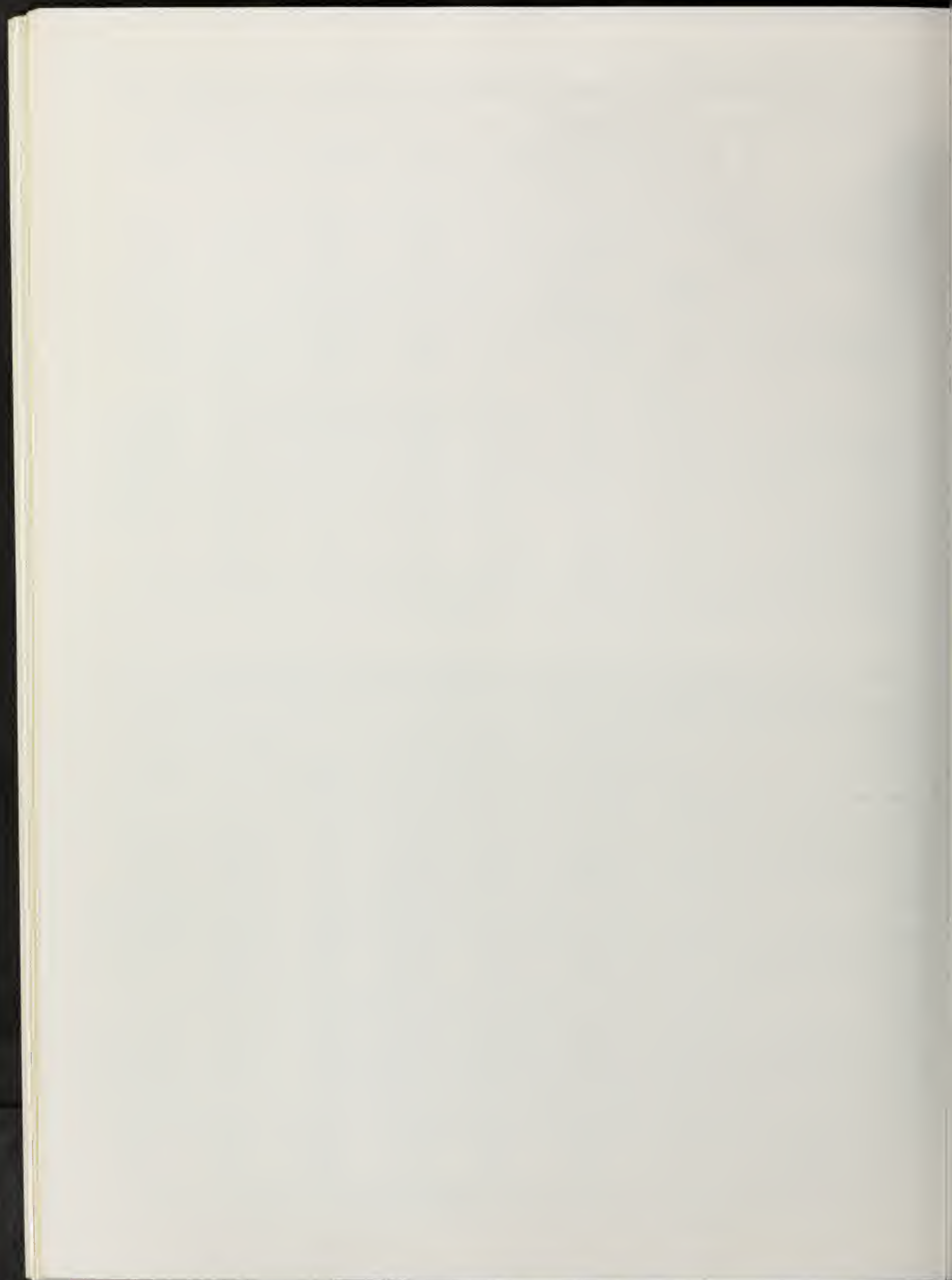
Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
All families.....	57,804	100.0	51,586	100.0	6,218	12.1
Families maintained by:						
Married couple.....	47,692	82.5	44,755	86.8	2,937	6.6
Other male householder.....	1,655	2.9	1,239	2.4	416	33.6
Other female householder.....	8,458	14.6	5,591	10.8	2,867	51.3
WHITE						
All families.....	50,910	100.0	46,261	100.0	4,649	10.0
Families maintained by:						
Married couple.....	43,636	85.7	41,049	88.7	2,587	6.3
Other male householder.....	1,355	2.7	1,048	2.3	307	29.3
Other female householder.....	5,918	11.6	4,165	9.0	1,753	42.1
BLACK						
All families.....	5,906	100.0	4,887	100.0	1,019	20.9
Families maintained by:						
Married couple.....	3,244	54.9	3,323	68.0	-79	-2.4
Other male householder.....	272	4.6	182	3.7	90	49.5
Other female householder.....	2,390	40.5	1,382	28.3	1,008	72.9
SPANISH ORIGIN¹						
All families.....	2,741	100.0	2,004	100.0	737	36.8
Families maintained by:						
Married couple.....	2,089	76.2	1,615	80.6	474	29.3
Other male householder.....	110	4.0	82	4.1	28	34.1
Other female householder.....	542	19.8	307	15.3	235	76.5

¹Source of 1970 Spanish-origin data: 1970 Census of Population, Family Composition, Vol. II, 4A, table 6. Persons of Spanish origin may be of any race.

Table 4. Number of Families With Own Children Under 18, by Type, Race, and Spanish Origin of Householder: 1979 and 1970
(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
All families.....	30,371	100.0	28,812	100.0	1,559	5.4
Families maintained by:						
Married couple.....	24,514	80.7	25,541	88.6	-1,027	-4.0
Other male householder.....	569	1.9	345	1.2	224	64.9
Other female householder.....	5,288	17.4	2,926	10.2	2,362	80.7
WHITE						
All families.....	26,056	100.0	25,543	100.0	513	2.0
Families maintained by:						
Married couple.....	22,101	84.8	23,277	91.1	-1,176	-5.1
Other male householder.....	444	1.7	271	1.1	173	63.8
Other female householder.....	3,511	13.5	1,995	7.8	1,516	76.0
BLACK						
All families.....	3,690	100.0	2,984	100.0	706	23.7
Families maintained by:						
Married couple.....	1,890	51.2	1,999	67.0	-109	-5.5
Other male householder.....	116	3.1	73	2.4	43	(B)
Other female householder.....	1,684	45.6	912	30.6	772	84.6
SPANISH ORIGIN¹						
All families.....	1,902	100.0	1,407	100.0	495	35.2
Families maintained by:						
Married couple.....	1,456	76.6	1,158	82.3	298	25.7
Other male householder.....	36	1.9	35	2.5	1	(B)
Other female householder.....	410	21.6	214	15.2	196	91.6

¹Source of 1970 Spanish-origin data: 1970 Census of Population, Family Composition, Vol. II, 4A, table 6. Persons of Spanish origin may be of any race.





Geography

PLACE OF RESIDENCE

Female householders maintaining families are distributed throughout the Nation in essentially the same manner as other types of families, or the population in general. The highly populated States with large numbers of families, not surprisingly, tend to be the ones containing most of the families maintained by women. In 1976 (the most recent year for which this information is currently available for States), about 1 of every 5 of the Nation's female-householder families lived in either California or New York. In fact, one-half of all such families were concentrated in just eight States: California, New York, Pennsylvania, Texas, Illinois, Ohio, Michigan, and Florida (table 5).

A somewhat more meaningful way of examining the inter-State differences is to compare the proportion of all families in each State that are maintained by female householders. In 1976, female householders constituted 15 percent or more of all families living in Mississippi, Georgia, New York, Louisiana, North Carolina, and Alabama. In 1970, there were no States with as many as 15 percent of the families being maintained by women with no husbands present.

In 1976, North Dakota and Wyoming had the lowest incidence of female family householders as a proportion of their families (6 percent and 7 percent, respectively). The corresponding proportions for the States in 1970 were essentially the same. One reason why relatively sparsely populated States such as Wyoming and North Dakota do not have a high incidence of female householder families is that families of this type tend to live inside the central cities of large metropolitan areas, and these States have few, if any, big cities. In 1979, 41 percent of female householders were in central cities and 32 percent were in the adjacent suburbs. Thus, metropolitan areas as a whole accounted for 73 percent of the total (table 6).

Black and Spanish-origin women maintaining families were more likely than were women maintaining families in

the general population to be concentrated in and around cities; 80 percent of Black and 90 percent of Spanish-origin women lived in metropolitan areas.

Not only did female householders tend to live in metropolitan areas (SMSA's), but 43 percent of all such women were in SMSA's with a population of 1 million or more. The proportion was even higher for Black (52 percent) and Spanish-origin women (64 percent).

The increase in women maintaining families is by no means confined to the centers of large cities. During the 1970's, the number of these families increased at a higher rate in suburban areas (71 percent) than in central cities (41 percent).

MOBILITY

Female householders were somewhat more mobile than family householders overall during the 1975-79 period. Among all family households, about 41 percent moved from one location to another within the United States or moved into the country from abroad, whereas 47 percent of families maintained by women made similar moves (table 7). The median age among these women was 33.4 years for those who changed their place of residence within the United States versus 50.5 years for female householders who had not moved since 1975. It seems likely that many of the moves were related to the dissolution of marriages, usually through separation or divorce.

It has been suggested that women maintaining families would tend to migrate to different States offering the most generous public services for women in their circumstances. However, the data do not indicate that this is necessarily true. About 8 percent of all family households and 7 percent of female family households moved to a different State between 1975 and 1979. While these data say nothing about the motivation for such moves, economic or otherwise, they do indicate that families maintained by women do not have a significantly greater likelihood than other families of moving to another State.

Table 5. Families and Female Householders With No Husband Present, by State: 1976 and 1970

(Numbers in thousands. For meaning of symbols, see text)

Regions, divisions, and States	All families	1976 ¹			1970			
		Female householder, no husband present			All families	Female householder, no husband present		
		Total	Percent of all families	Percent distribution		Total	Percent of all families	Percent distribution
United States, total.....	56,080	7,493	13.4	100.0	50,969	5,504	10.8	100.0
Northeast.....	12,842	1,906	14.8	25.4	12,342	1,459	11.8	26.5
New England.....	3,136	428	13.6	5.7	2,925	327	11.2	5.9
Maine.....	278	32	11.7	0.4	246	24	9.8	0.4
New Hampshire.....	218	23	10.8	0.3	183	16	8.7	0.3
Vermont.....	122	14	11.6	0.2	106	10	9.4	0.2
Massachusetts.....	1,482	215	14.5	2.9	1,388	169	12.2	3.1
Rhode Island.....	241	35	14.6	0.5	235	28	11.9	0.5
Connecticut.....	820	107	13.1	1.4	767	80	10.4	1.5
Middle Atlantic.....	9,678	1,477	15.3	19.7	9,417	1,132	12.0	20.6
New York.....	4,675	775	16.6	10.3	4,585	592	12.9	10.8
New Jersey.....	1,926	266	13.8	3.5	1,833	203	11.1	3.7
Pennsylvania.....	3,076	435	14.2	5.8	2,999	337	11.2	6.1
North Central.....	15,060	1,770	11.8	23.6	14,127	1,314	9.3	23.9
East North Central.....	10,683	1,344	12.6	17.9	10,039	975	9.7	17.7
Ohio.....	2,832	349	12.3	4.7	2,683	263	9.8	4.8
Indiana.....	1,421	146	10.3	1.9	1,318	115	8.7	2.1
Illinois.....	2,848	399	14.0	5.3	2,784	297	10.7	5.4
Michigan.....	2,398	333	13.9	4.4	2,182	211	9.7	3.8
Wisconsin.....	1,181	114	9.7	1.5	1,072	88	8.2	1.6
West North Central.....	4,376	426	9.7	5.7	4,089	339	8.3	6.2
Minnesota.....	994	93	9.4	1.2	917	72	7.9	1.3
Iowa.....	750	61	8.2	0.8	713	52	7.3	0.9
Missouri.....	1,275	147	11.6	2.0	1,200	119	9.9	2.2
North Dakota.....	158	9	6.2	0.1	147	10	6.8	0.2
South Dakota.....	177	15	8.5	0.2	160	12	7.5	0.2
Nebraska.....	401	35	8.8	0.5	372	28	7.5	0.5
Kansas.....	619	63	10.2	0.8	579	47	8.1	0.9
South.....	18,251	2,544	13.9	34.0	15,839	1,839	11.6	33.4
South Atlantic.....	9,078	1,312	14.5	17.5	7,742	933	12.1	17.0
Delaware.....	153	19	13.0	0.3	136	14	10.3	0.3
Maryland.....	1,066	157	14.8	2.1	972	112	11.5	2.0
District of Columbia.....	158	56	35.6	0.7	163	41	25.2	0.7
Virginia.....	1,317	160	12.1	2.1	1,159	130	11.2	2.4
West Virginia.....	494	56	11.4	0.7	452	49	10.8	0.9
North Carolina.....	1,504	228	15.2	3.0	1,286	153	11.9	2.8
South Carolina.....	730	107	14.7	1.4	624	83	13.3	1.5
Georgia.....	1,292	215	16.7	2.9	1,144	150	13.1	2.7
Florida.....	2,360	310	13.2	4.1	1,806	201	11.1	3.7
East South Central.....	3,638	526	14.5	7.0	3,241	386	11.9	7.0
Kentucky.....	909	115	12.7	1.5	821	88	10.7	1.6
Tennessee.....	1,161	163	14.1	2.2	1,020	119	11.7	2.2
Alabama.....	969	146	15.1	1.9	870	108	12.4	2.0
Mississippi.....	597	101	17.0	1.3	530	71	13.4	1.3
West South Central.....	5,535	705	12.7	9.4	4,856	519	10.7	9.4
Arkansas.....	584	67	11.6	0.9	502	51	10.2	0.9
Louisiana.....	944	146	15.5	1.9	868	117	13.5	2.1
Oklahoma.....	748	77	10.4	1.0	677	67	9.9	1.2
Texas.....	3,258	413	12.7	5.5	2,810	284	10.1	5.2
West.....	9,924	1,271	12.8	17.0	8,660	893	10.3	16.2
Mountain.....	2,527	276	10.9	3.7	2,033	182	9.0	3.3
Montana.....	193	16	8.5	0.2	170	13	7.6	0.2
Idaho.....	221	19	8.9	0.3	179	13	7.3	0.2
Wyoming.....	100	7	7.3	0.1	84	6	7.1	0.1
Colorado.....	660	72	11.0	1.0	545	50	9.2	0.9
New Mexico.....	297	42	14.3	0.6	242	26	10.7	0.5
Arizona.....	592	67	11.4	0.9	439	43	9.8	0.8
Utah.....	303	27	9.1	0.4	249	20	8.0	0.4
Nevada.....	159	21	13.5	0.3	124	11	8.9	0.2
Pacific.....	7,397	995	13.5	13.3	6,628	711	10.7	12.9
Washington.....	924	98	10.6	1.3	862	75	8.7	1.4
Oregon.....	615	69	11.3	0.9	542	45	8.3	0.8
California.....	5,574	796	14.3	10.6	4,988	571	11.4	10.4
Alaska.....	82	8	10.5	0.1	66	4	(B)	0.1
Hawaii.....	200	22	11.1	0.3	170	16	9.4	0.3

¹The 1976 total includes secondary families (i.e., unrelated subfamilies). Such family groups were not included in 1970 Census total.

Source: Current Population Reports, Series P-20, No. 334, Demographic, Social, and Economic Profile of States: Spring 1976, table 6. 1970 Census of Population, Vol. I, U.S. Summary, table 65.

Table 6. Residence of Families Maintained by Female Householders With No Husband Present, by Race and Spanish Origin: 1979 and 1970

(Numbers in thousands. For meaning of symbols, see text)

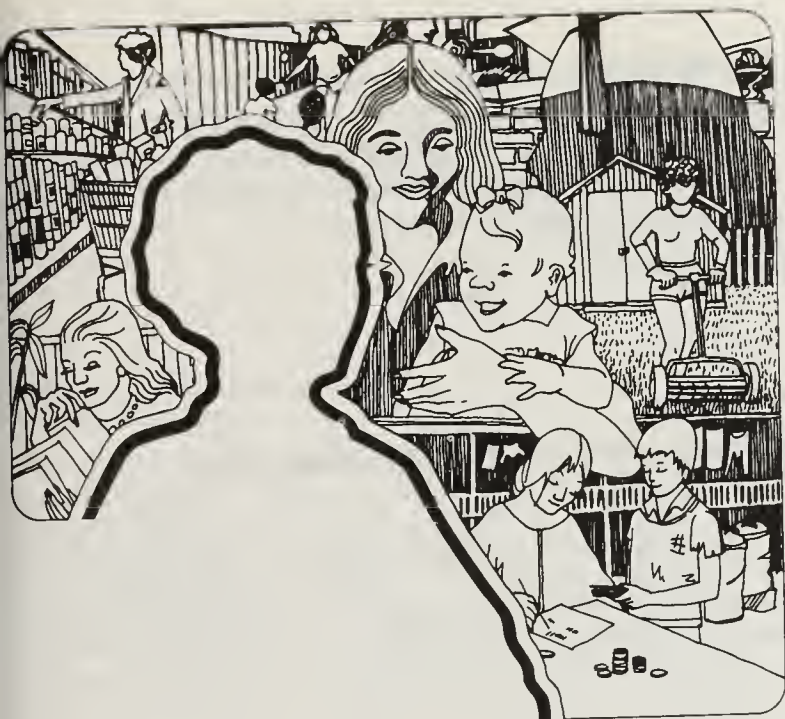
Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
Total female householders, no husband present.....	8,458	100.0	5,591	100.0	2,867	51.3
In nonmetropolitan areas.....	2,263	26.8	1,535	27.5	728	47.4
In metropolitan areas.....	6,195	73.2	4,056	72.5	2,139	52.7
Central cities.....	3,473	41.1	2,465	44.1	1,008	40.9
Suburban areas.....	2,722	32.2	1,591	28.5	1,131	71.1
Size of metropolitan area:						
3,000,000 or more.....	1,810	21.4	1,292	23.1	518	40.1
1,000,000 to 2,999,999.....	1,825	21.6	1,136	20.3	689	60.7
250,000 to 999,999.....	1,882	22.3	1,130	20.2	752	66.5
Less than 250,000.....	678	8.0	499	8.9	179	35.9
WHITE						
Total female householders, no husband present.....	5,918	100.0	4,165	100.0	1,753	42.1
In nonmetropolitan areas.....	1,727	29.2	1,198	28.8	529	44.2
In metropolitan areas.....	4,192	70.8	2,966	71.2	1,226	41.3
Central cities.....	1,891	32.0	1,559	37.4	332	21.3
Suburban areas.....	2,300	38.9	1,408	33.8	892	63.4
Size of metropolitan area:						
3,000,000 or more.....	1,079	18.2	903	21.7	176	19.5
1,000,000 to 2,999,999.....	1,253	21.2	791	19.0	462	58.4
250,000 to 999,999.....	1,362	23.0	867	20.8	495	57.1
Less than 250,000.....	497	8.4	405	9.7	92	22.7
BLACK						
Total female householders, no husband present.....	2,390	100.0	1,382	100.0	1,008	72.9
In nonmetropolitan areas.....	490	20.5	324	23.5	166	51.2
In metropolitan areas.....	1,899	79.5	1,058	76.5	841	79.5
Central cities.....	1,530	64.0	883	63.9	647	73.3
Suburban areas.....	369	15.4	175	12.7	194	110.9
Size of metropolitan area:						
3,000,000 or more.....	686	28.7	382	27.6	304	79.6
1,000,000 to 2,999,999.....	548	22.9	341	24.6	207	60.7
250,000 to 999,999.....	489	20.5	244	17.7	245	100.4
Less than 250,000.....	177	7.4	91	6.6	86	94.5
SPANISH ORIGIN¹						
Total female householders, no husband present.....	542	100.0	(NA)	(NA)	(NA)	(NA)
In nonmetropolitan areas.....	59	10.8	(NA)	(NA)	(NA)	(NA)
In metropolitan areas.....	484	89.2	(NA)	(NA)	(NA)	(NA)
Central cities.....	347	63.9	(NA)	(NA)	(NA)	(NA)
Suburban areas.....	137	25.2	(NA)	(NA)	(NA)	(NA)
Size of metropolitan area:						
3,000,000 or more.....	251	46.2	(NA)	(NA)	(NA)	(NA)
1,000,000 to 2,999,999.....	97	18.0	(NA)	(NA)	(NA)	(NA)
250,000 to 999,999.....	97	18.0	(NA)	(NA)	(NA)	(NA)
Less than 250,000.....	38	7.0	(NA)	(NA)	(NA)	(NA)

¹Persons of Spanish origin may be of any race.

Table 7. Mobility of Family Householders Between 1975 and 1979

(Numbers in thousands. For meaning of symbols, see text)

Subject	Total		Nonmovers	Movers in United States				Movers from abroad
	Number	Percent		Total	Same county	Same State	Different State	
ALL FAMILY HOUSEHOLDERS								
Total, 14 years and over...	57,804	100.0	58.7	40.0	23.5	8.7	7.8	1.3
14 to 19 years.....	312	100.0	10.3	87.8	61.5	14.7	11.5	1.9
20 to 24 years.....	3,525	100.0	7.1	90.3	56.8	17.3	16.2	2.6
25 to 29 years.....	6,473	100.0	19.5	77.5	44.9	17.3	15.2	3.0
30 to 34 years.....	7,005	100.0	37.1	60.9	35.7	13.5	11.7	2.0
35 to 44 years.....	11,754	100.0	58.0	40.5	23.8	8.6	8.1	1.5
45 to 64 years.....	20,225	100.0	77.3	22.0	12.8	5.0	4.2	0.7
65 years and over.....	8,510	100.0	85.8	13.8	7.2	3.4	3.2	0.4
Median age.....	44.8	(X)	52.5	33.6	33.4	33.9	34.0	33.4
ALL FEMALE HOUSEHOLDERS, NO HUSBAND PRESENT								
Total, 14 years and over...	8,458	100.0	53.0	45.8	31.5	7.6	6.8	1.1
14 to 19 years.....	121	100.0	10.7	88.4	62.8	15.7	9.9	0.8
20 to 24 years.....	680	100.0	10.9	88.1	61.8	13.2	13.1	1.0
25 to 29 years.....	1,016	100.0	20.4	78.0	52.7	12.2	13.0	1.8
30 to 34 years.....	1,112	100.0	39.4	58.4	38.8	10.4	9.2	2.2
35 to 44 years.....	1,851	100.0	52.1	46.6	32.0	8.0	6.5	1.4
45 to 64 years.....	2,482	100.0	70.1	28.9	20.2	5.0	3.7	0.9
65 years and over.....	1,196	100.0	87.6	12.4	8.8	1.6	2.0	-
Median age.....	42.0	(X)	50.5	33.4	33.5	33.8	32.6	34.7



Demographic Characteristics of the Women

AGE

Women maintaining families in 1979 were likely to be younger than their 1970 counterparts. In 1970, the median age of these women was 48.2 years (table 8). Since then, the number of women 45 years or older maintaining families has increased by 525,000 (17 percent), while the number of those under 45 years of age has increased by about 2.3 million (96 percent). As a result, the median age of women maintaining families declined by 6.2 years from 48.2 to 42.0 years between 1970 and 1979.

As one would expect, female family householders with children still at home were younger than the overall population of women maintaining families. In 1970, 75 percent of female householders with children were under 45 years old, compared with 44 percent of all female householders; the corresponding proportions for 1979 were 82 percent and 57 percent, respectively.

Between 1970 and 1979, the median age of White female householders declined by 6.8 years from 50.5 to 43.7 years; however, they were still likely to be somewhat older than their Black or Spanish-origin counterparts. The race and ethnicity differentials in median age were smaller among women with children.

MARITAL STATUS

Marital status is closely related to the age composition of the population. For instance, if there is a high proportion of people in their seventies or older, there is likely to be a similarly high proportion of widowed persons. Conversely, if a high proportion of the population is made up of people in their twenties or younger, there is likely to be a relative abundance of single (never-married) persons.

As the average age of female householders has declined, their marital status characteristics have altered significantly.

Between 1970 and 1979, the proportion that were widows showed a large decline, while the percentage who were single or divorced women increased rather dramatically. Consequently by 1979, 1 of every 2 female householders had either never been married or had terminated the marriage by divorce (table 9).

Most of the female householders without children were widows, whereas those with children were most likely to be divorced. However, it was those families with children that were maintained by never-married mothers which registered the most dramatic increase during the decade. During the 1970-79 period, there was a four-fold increase in the number of "unmarried-mother" families.

Black women maintaining families were more likely to be single or separated and less likely to be divorced or widowed than their White counterparts. This pattern was observed in both 1970 and 1979.

EDUCATION

More than one-half of the female family householders in 1970 had not completed 4 years of high school. However, this level of schooling was not typical of the numerous mother-child situations. Many of those who had not completed high school were older women and women whose children were no longer living at home. As the population of female householders has become more youthful and includes more women with children, there has been a decrease in the proportion of women who did not finish high school. Thus in 1979, the majority (59 percent) of women maintaining families were at least high school graduates, and 21 percent had attended college (table 10).

In terms of the increase in female householders by level of education, the highest rate of growth since 1970 was for those with some college. Growth rates in excess of 100

percent were exhibited by both those with 1 to 3 years of college and those with 4 years of college or more. Among the corresponding female householders under age 45 with children, the rates of increase since 1970 in the number of women maintaining families were even higher.

Racial differences in the years of school completed by women maintaining families were substantial. Even as recently as 1979, a majority (53 percent) of the Black women were not high school graduates; among White women the proportion was considerably less (37 percent).

Table 8. Age of Female Householders With No Husband Present, by Race, Spanish Origin, and Presence of Children: 1979 and 1970

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
All Female Householders, No Husband Present						
Total, 14 years and over.....	8,458	100.0	5,591	100.0	2,867	51.3
14 to 24 years.....	801	9.5	436	7.8	365	83.7
25 to 29 years.....	1,016	12.0	463	8.3	553	119.4
30 to 34 years.....	1,112	13.1	466	8.3	646	138.6
35 to 44 years.....	1,851	21.9	1,075	19.2	776	72.2
45 to 54 years.....	1,518	17.9	1,100	19.7	418	38.0
55 to 64 years.....	963	11.4	921	16.5	42	4.6
65 to 74 years.....	712	8.4	640	11.4	72	11.3
75 years and over.....	484	5.7	491	8.8	-7	-1.4
Median age.....	42.0	(X)	48.2	(X)	(X)	(X)
With Own Children Under 18						
Total, 14 years and over.....	5,288	100.0	2,926	100.0	2,362	80.7
14 to 24 years.....	709	13.4	371	12.7	338	91.1
25 to 29 years.....	946	17.9	440	15.0	506	115.0
30 to 34 years.....	1,068	20.2	449	15.3	619	137.9
35 to 44 years.....	1,616	30.6	921	31.5	695	75.5
45 to 54 years.....	786	14.9	630	21.5	156	24.8
55 to 64 years.....	151	2.9	106	3.6	45	42.5
65 years and over.....	12	0.2	9	0.3	3	(B)
Median age.....	34.6	(X)	37.2	(X)	(X)	(X)
WHITE						
All Female Householders, No Husband Present						
Total, 14 years and over.....	5,918	100.0	4,165	100.0	1,753	42.1
14 to 24 years.....	468	7.9	283	6.8	185	65.4
25 to 29 years.....	647	10.9	297	7.1	350	117.8
30 to 34 years.....	719	12.1	287	6.9	432	150.5
35 to 44 years.....	1,296	21.9	742	17.8	554	74.7
45 to 54 years.....	1,105	18.7	860	20.6	245	28.5
55 to 64 years.....	716	12.1	739	17.7	-23	-3.1
65 to 74 years.....	559	9.4	534	12.8	25	4.7
75 years and over.....	408	6.9	423	10.2	-15	-3.5
Median age.....	43.7	(X)	50.5	(X)	(X)	(X)
With Own Children Under 18						
Total, 14 years and over.....	3,511	100.0	1,995	100.0	1,516	76.0
14 to 24 years.....	400	11.4	200	10.0	200	100.0
25 to 29 years.....	601	17.1	279	14.0	322	115.4
30 to 34 years.....	693	19.7	303	15.2	390	128.7
35 to 44 years.....	1,146	32.6	654	32.8	492	75.2
45 to 54 years.....	562	16.0	453	22.7	109	24.1
55 to 64 years.....	102	2.9	92	4.6	10	10.9
65 years and over.....	6	0.2	14	0.7	-8	(B)
Median age.....	35.5	(X)	38.3	(X)	(X)	(X)

Table 8. Age of Female Householders With No Husband Present, by Race, Spanish Origin, and Presence of Children: 1979 and 1970—Continued

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
BLACK						
All Female Householders, No Husband Present						
Total, 14 years and over.....	2,390	100.0	1,382	100.0	1,008	72.9
14 to 24 years.....	316	13.2	148	10.7	168	113.5
25 to 29 years.....	351	14.7	162	11.7	189	116.7
30 to 34 years.....	376	15.7	175	12.7	201	114.9
35 to 44 years.....	526	22.0	327	23.7	199	60.9
45 to 54 years.....	378	15.8	233	16.9	145	62.2
55 to 64 years.....	230	9.6	173	12.5	57	32.9
65 to 74 years.....	144	6.0	102	7.4	42	41.2
75 years and over.....	70	2.9	63	4.6	7	(B)
Median age.....	37.9	(X)	41.3	(X)	(X)	(X)
With Own Children Under 18						
Total, 14 years and over.....	1,684	100.0	912	100.0	772	84.6
14 to 24 years.....	295	17.5	124	13.6	171	137.9
25 to 29 years.....	331	19.7	157	17.2	174	110.8
30 to 34 years.....	358	21.3	168	18.4	190	113.1
35 to 44 years.....	447	26.5	285	31.3	162	56.8
45 to 54 years.....	204	12.1	137	15.0	67	48.9
55 to 64 years.....	43	2.6	33	3.6	10	(B)
65 years and over.....	6	0.4	8	0.9	-2	(B)
Median age.....	33.0	(X)	35.2	(X)	(X)	(X)
SPANISH ORIGIN¹						
All Female Householders, No Husband Present						
Total, 14 years and over.....	542	100.0	307	100.0	235	76.5
14 to 24 years.....	79	14.6	32	10.4	47	(B)
25 to 29 years.....	97	17.9	39	12.7	58	(B)
30 to 34 years.....	81	14.9	41	13.4	40	(B)
35 to 44 years.....	127	23.4	80	26.1	47	58.8
45 to 54 years.....	90	16.6	55	17.9	35	(B)
55 to 64 years.....	34	6.3	33	10.7	1	(B)
65 to 74 years.....	28	5.2	26	8.5	8	(B)
75 years and over.....	6	1.1				
Median age.....	36.1	(X)	40.2	(X)	(X)	(X)
With Own Children Under 18						
Total, 14 years and over.....	410	100.0	214	100.0	196	91.6
14 to 24 years.....	69	16.8	28	13.1	41	(B)
25 to 29 years.....	88	21.5	36	16.8	52	(B)
30 to 34 years.....	80	19.5	38	17.8	42	(B)
35 to 44 years.....	115	28.0	69	32.2	46	(B)
45 to 54 years.....	50	12.2	34	15.9	16	(B)
55 to 64 years.....	8	2.0	8	3.7	-	(B)
65 years and over.....	-	-	2	0.9	-	(B)
Median age.....	33.0	(X)	35.7	(X)	(X)	(X)

¹Source of 1970 Spanish-origin data: 1970 Census of Population, Family Composition, Vol. II, 4A, table 6. Persons of Spanish origin may be of any race.

Table 9. Marital Status of Female Householders With No Husband Present, by Race and Presence of Children: 1979 and 1970

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
All Female Householders, No Husband Present						
Total.....	8,458	100.0	5,591	100.0	2,867	51.3
Single (never married).....	1,416	16.7	610	10.9	806	132.1
Married, husband absent.....	1,770	20.9	1,326	23.7	444	33.5
Separated.....	1,502	17.8	945	16.9	557	58.9
Other.....	268	3.2	381	6.8	-113	-29.7
Divorced.....	2,807	33.2	1,259	22.5	1,548	123.0
Widowed.....	2,465	29.1	2,396	42.9	69	2.9
With No Own Children Under 18						
Total.....	3,170	100.0	2,667	100.0	503	18.9
Single (never married).....	514	16.2	377	14.1	137	36.3
Married, husband absent.....	296	9.3	234	8.8	62	26.5
Separated.....	243	7.7	174	6.5	69	39.7
Other.....	53	1.7	60	2.2	-7	(B)
Divorced.....	573	18.1	303	11.4	270	89.1
Widowed.....	1,786	56.3	1,753	65.7	33	1.9
With Own Children Under 18						
Total.....	5,288	100.0	2,926	100.0	2,362	80.7
Single (never married).....	902	17.1	234	8.0	668	285.8
Married, husband absent.....	1,473	27.9	1,093	37.4	380	34.8
Separated.....	1,258	23.8	771	26.3	487	63.2
Other.....	215	4.1	322	11.0	-107	-33.2
Divorced.....	2,234	42.2	956	32.7	1,278	133.7
Widowed.....	679	12.8	644	22.0	35	5.4
WHITE						
All Female Householders, No Husband Present						
Total.....	5,918	100.0	4,165	100.0	1,753	42.1
Single (never married).....	681	11.5	382	9.2	299	78.3
Married, husband absent.....	1,050	17.7	767	18.4	283	36.9
Separated.....	846	14.3	470	11.3	376	80.0
Other.....	204	3.4	297	7.1	-93	-31.3
Divorced.....	2,297	38.8	1,055	25.3	1,242	117.7
Widowed.....	1,891	32.0	1,960	47.1	-69	-3.5
With No Own Children Under 18						
Total.....	2,408	100.0	2,170	100.0	238	11.0
Single (never married).....	383	15.9	316	14.6	67	21.2
Married, husband absent.....	146	6.1	136	6.3	10	7.4
Separated.....	107	4.4	85	3.9	22	25.9
Other.....	39	1.6	51	2.4	-12	(B)
Divorced.....	474	19.7	256	11.8	218	85.2
Widowed.....	1,406	58.4	1,461	67.3	-55	-3.8
With Own Children Under 18						
Total.....	3,511	100.0	1,995	100.0	1,516	76.0
Single (never married).....	298	8.5	66	3.3	232	(B)
Married, husband absent.....	904	25.7	630	31.6	274	43.5
Separated.....	739	21.0	384	19.2	355	92.4
Other.....	165	4.7	246	12.3	-81	-32.9
Divorced.....	1,823	51.9	799	40.1	1,024	128.2
Widowed.....	485	13.8	500	25.1	-15	-3.0

Table 9. Marital Status of Female Householders With No Husband Present, by Race and Presence of Children: 1979 and 1970—Continued

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
BLACK						
All Female Householders, No Husband Present						
Total.....	2,390	100.0	1,382	100.0	1,008	72.9
Single (never married).....	705	29.5	223	16.1	482	216.1
Married, husband absent.....	687	28.7	546	39.5	141	25.8
Separated.....	636	26.6	468	33.9	168	35.9
Other.....	51	2.1	78	5.6	-27	-34.6
Divorced.....	474	19.8	196	14.2	278	141.8
Widowed.....	523	21.9	417	30.2	106	25.4
With No Own Children Under 18						
Total.....	706	100.0	472	100.0	234	49.6
Single (never married).....	118	16.7	58	12.3	60	(B)
Married, husband absent.....	147	20.8	94	19.9	53	56.4
Separated.....	133	18.8	87	18.4	46	52.9
Other.....	14	2.0	7	1.5	7	(B)
Divorced.....	93	13.2	45	9.5	48	(B)
Widowed.....	348	49.3	276	58.5	72	26.1
With Own Children Under 18						
Total.....	1,684	100.0	912	100.0	772	84.6
Single (never married).....	588	34.9	166	18.2	422	254.2
Married, husband absent.....	541	32.1	454	49.8	87	19.2
Separated.....	503	29.9	382	41.9	121	31.7
Other.....	38	2.3	72	8.0	-34	(B)
Divorced.....	381	22.6	151	16.6	230	152.3
Widowed.....	174	10.3	141	15.5	33	23.4

Table 10. Years of School Completed by Female Householders With No Husband Present, by Age, Race, and Presence of Children: 1979 and 1970

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
All Female Householders, No Husband Present						
Total, all ages.....	8,458	100.0	5,591	100.0	2,867	51.3
Elementary:						
0 to 8 years.....	1,696	20.1	1,797	32.1	-101	-5.6
High school:						
1 to 3 years.....	1,810	21.4	1,274	22.8	536	42.1
4 years.....	3,160	37.4	1,777	31.8	1,383	77.8
College:						
1 to 3 years.....	1,184	14.0	464	8.3	720	155.2
4 years or more.....	608	7.2	279	5.0	329	117.9
Total, under age 45.....	4,780	100.0	2,439	100.0	2,341	96.0
Elementary:						
0 to 8 years.....	440	9.2	402	16.5	38	9.5
High school:						
1 to 3 years.....	1,174	24.6	741	30.4	433	58.4
4 years.....	2,009	42.0	961	39.4	1,048	109.1
College:						
1 to 3 years.....	821	17.2	240	9.8	581	242.1
4 years or more.....	336	7.0	94	3.9	242	257.4
Total, age 45 and over.....	3,677	100.0	3,153	100.0	524	16.6
Elementary:						
0 to 8 years.....	1,256	34.2	1,395	44.2	-139	-10.0
High school:						
1 to 3 years.....	636	17.3	533	16.9	103	19.3
4 years.....	1,151	31.3	816	25.9	335	41.1
College:						
1 to 3 years.....	363	9.9	224	7.1	139	62.1
4 years or more.....	272	7.4	185	5.9	87	47.0
With Own Children Under 18						
Total, all ages.....	5,288	100.0	2,926	100.0	2,362	80.7
Elementary:						
0 to 8 years.....	656	12.4	614	21.0	42	6.8
High school:						
1 to 3 years.....	1,295	24.5	830	28.4	465	56.0
4 years.....	2,118	40.1	1,085	37.1	1,033	95.2
College:						
1 to 3 years.....	883	16.7	267	9.1	616	230.7
4 years or more.....	336	6.4	131	4.5	205	156.5
Total, under age 45.....	4,339	100.0	2,181	100.0	2,158	98.9
Elementary:						
0 to 8 years.....	403	9.3	358	16.4	45	12.6
High school:						
1 to 3 years.....	1,095	25.2	693	31.8	402	58.0
4 years.....	1,808	41.7	853	39.1	955	112.0
College:						
1 to 3 years.....	756	17.4	200	9.2	556	278.0
4 years or more.....	277	6.4	77	3.5	200	259.7
Total, age 45 and over.....	949	100.0	745	100.0	204	27.4
Elementary:						
0 to 8 years.....	253	26.7	256	34.4	-3	-1.2
High school:						
1 to 3 years.....	200	21.1	137	18.4	63	46.0
4 years.....	310	32.7	232	31.1	78	33.6
College:						
1 to 3 years.....	127	13.4	67	9.0	60	(B)
4 years or more.....	59	6.2	54	7.2	5	(B)

Table 10. Years of School Completed by Female Householders With No Husband Present, by Age, Race, and Presence of Children: 1979 and 1970—Continued

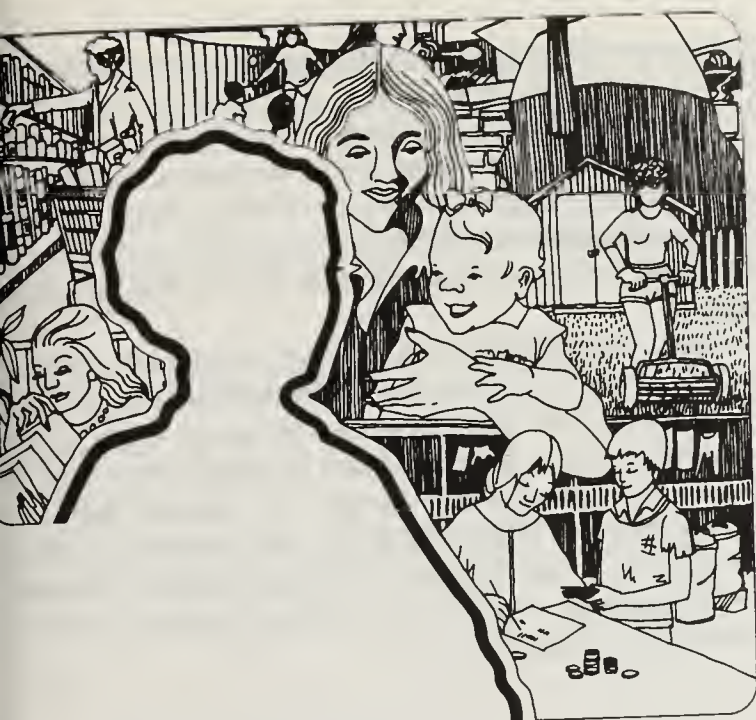
(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
WHITE						
All Female Householders, No Husband Present						
Total, all ages.....	5,918	100.0	4,165	100.0	1,753	42.1
Elementary:						
0 to 8 years.....	1,141	19.3	1,236	29.7	-95	-7.7
High school:						
1 to 3 years.....	1,042	17.6	825	19.8	217	26.3
4 years.....	2,367	40.0	1,447	34.7	920	63.6
College:						
1 to 3 years.....	863	14.6	397	9.5	466	117.4
4 years or more.....	505	8.5	261	6.3	244	93.5
Total, under age 45.....	3,130	100.0	1,609	100.0	1,521	94.5
Elementary:						
0 to 8 years.....	281	9.0	235	14.6	46	19.6
High school:						
1 to 3 years.....	643	20.5	402	25.0	241	60.0
4 years.....	1,368	43.7	696	43.3	672	96.6
College:						
1 to 3 years.....	562	18.0	191	11.9	371	194.2
4 years or more.....	276	8.8	86	5.3	190	220.9
Total, age 45 and over.....	2,788	100.0	2,556	100.0	232	9.1
Elementary:						
0 to 8 years.....	860	30.8	1,001	39.2	-141	-14.1
High school:						
1 to 3 years.....	399	14.3	423	16.5	-24	-5.7
4 years.....	999	35.8	751	29.4	248	33.0
College:						
1 to 3 years.....	301	10.8	206	8.1	95	46.1
4 years or more.....	229	8.2	175	6.8	54	30.9
With Own Children Under 18						
Total, all ages.....	3,511	100.0	1,995	100.0	1,516	76.0
Elementary:						
0 to 8 years.....	413	11.8	375	18.8	38	10.1
High school:						
1 to 3 years.....	701	20.0	489	24.5	212	43.4
4 years.....	1,494	42.6	770	38.6	724	94.0
College:						
1 to 3 years.....	616	17.5	225	11.3	391	173.8
4 years or more.....	286	8.1	136	6.8	150	110.3
Total, under age 45.....	2,840	100.0	1,438	100.0	1,402	97.5
Elementary:						
0 to 8 years.....	258	9.1	223	15.5	35	15.7
High school:						
1 to 3 years.....	603	21.2	371	25.8	232	62.5
4 years.....	1,227	43.2	585	40.7	642	109.7
College:						
1 to 3 years.....	516	18.2	166	11.5	350	210.8
4 years or more.....	237	8.3	94	6.5	143	152.1
Total, age 45 and over.....	670	100.0	557	100.0	113	20.3
Elementary:						
0 to 8 years.....	155	23.1	154	27.6	1	0.6
High school:						
1 to 3 years.....	98	14.6	118	21.2	-20	-16.9
4 years.....	267	39.9	186	33.4	81	43.5
College:						
1 to 3 years.....	100	14.9	60	10.8	40	(B)
4 years or more.....	49	7.3	40	7.2	9	(B)

Table 10. Years of School Completed by Female Householders With No Husband Present, by Age, Race, and Presence of Children: 1979 and 1970—Continued

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
BLACK						
All Female Householders, No Husband Present						
Total, all ages.....	2,390	100.0	1,382	100.0	1,008	72.9
Elementary:						
0 to 8 years.....	523	21.9	544	39.4	-21	-3.9
High school:						
1 to 3 years.....	735	30.8	439	31.8	296	67.4
4 years.....	748	31.3	321	23.2	427	133.0
College:						
1 to 3 years.....	305	12.8	63	4.6	242	(B)
4 years or more.....	79	3.3	15	1.1	64	(B)
Total, under age 45.....	1,568	100.0	812	100.0	756	93.1
Elementary:						
0 to 8 years.....	150	9.6	164	20.2	-14	-8.5
High school:						
1 to 3 years.....	511	32.6	334	41.1	177	53.0
4 years.....	613	39.1	262	32.3	351	134.0
College:						
1 to 3 years.....	251	16.0	44	5.4	207	(B)
4 years or more.....	44	2.8	7	0.9	37	(B)
Total, age 45 and over.....	822	100.0	571	100.0	251	44.0
Elementary:						
0 to 8 years.....	373	45.4	380	66.5	-7	-1.8
High school:						
1 to 3 years.....	224	27.3	105	18.4	119	113.3
4 years.....	135	16.4	59	10.3	76	(B)
College:						
1 to 3 years.....	54	6.6	19	3.3	35	(B)
4 years or more.....	35	4.3	8	1.4	27	(B)
With Own Children Under 18						
Total, all ages.....	1,684	100.0	912	100.0	772	84.6
Elementary:						
0 to 8 years.....	230	13.7	258	28.3	-28	-10.9
High school:						
1 to 3 years.....	567	33.7	344	37.7	223	64.8
4 years.....	593	35.2	238	26.1	355	149.2
College:						
1 to 3 years.....	257	15.3	50	5.5	207	(B)
4 years or more.....	37	2.2	22	2.4	15	(B)
Total, under age 45.....	1,430	100.0	734	100.0	696	94.8
Elementary:						
0 to 8 years.....	139	9.7	166	22.6	-27	-16.3
High school:						
1 to 3 years.....	472	33.0	294	40.1	178	60.5
4 years.....	555	38.8	213	29.0	342	160.6
College:						
1 to 3 years.....	234	16.4	44	6.0	190	(B)
4 years or more.....	30	2.1	17	2.3	13	(B)
Total, age 45 and over.....	253	100.0	178	100.0	75	42.1
Elementary:						
0 to 8 years.....	91	36.0	93	52.2	-2	-2.2
High school:						
1 to 3 years.....	95	37.5	50	28.1	45	(B)
4 years.....	38	15.0	26	14.6	12	(B)
College:						
1 to 3 years.....	23	9.1	6	3.4	17	(B)
4 years or more.....	7	2.8	5	2.8	2	(B)



Demographic Characteristics of the Families

SIZE

Most families maintained by female householders are not very large. Almost three-quarters of such families (73 percent) consisted of no more than two or three people. As of 1979, the average number of family members was 3.08 persons, down from 3.22 persons in 1970 (table 11).

There are, of course, some racial and ethnic differentials in average family size. For example, families maintained by Black women in 1979 were larger on the average (3.63 persons) than those maintained by either Spanish-origin women (3.30 persons) or White women (2.86 persons).

NUMBER OF CHILDREN

Families maintained by women in 1979 were more likely to include children than were their 1970 counterparts. The rate of increase since 1970 in the number of families comprised of a mother and one or more children has been about 81 percent as compared with a 51-percent increase in the overall number of women maintaining families (table 12).

Contrary to the stereotype of a mother who has been abandoned to fend for herself and her numerous offspring, families maintained by women, if they had any children at all, were likely to include only one or two children. These one-child and two-child families have more than doubled in number since 1970. As of 1979, about 28 percent of all women maintaining families had one child and 20 percent had two, whereas 9 percent had three and only 5 percent had 4 or more children; the other 38 percent had either never had any children or their children were living elsewhere.

The average number of children in families of female householders with children in 1979 was down to 1.86 from the average of 2.29 in 1970. The averages were somewhat higher in Black and Spanish-origin families than in White families in both years.

The total number of children under 18 living in families maintained by women in 1979 was 9.8 million. About 2.4 million of these children were under 6 years of age and the remaining 7.4 million children were 6 to 17 years of age. It should be noted that these numbers do not include every child living in a one-parent situation. A relatively small, but nevertheless significant, number of children living with one parent were either with mothers who were not the person responsible for maintaining the household (about 700,000 children), or else they lived with their father instead of their mother (about 1.0 million children, or 9 percent of all those living with one parent).

AGE OF CHILDREN

Since most women with children at home are under age 45, the data in this section refer only to women in that age category. In 1979, there were just over 1 million families maintained by such women which contained only children under age 6, and an additional 861,000 families which had both children under 6 and some 6 to 17 (table 13).

All women with responsibility for the care and custody of their children (i.e., no husband present) face special, and sometimes debilitating, problems. However, when these families include very young children, it may be especially difficult for the woman to enter the work force on a full-time or even part-time basis, unless she is able to find acceptable day-care services for her preschool children. The number of families maintained by women with only children under age 6 has doubled since 1970, and the rate of increase for this type of family was much greater than the overall rate of increase in the number of families maintained by women.

There were about 2.4 million families maintained by women which included only children of school age (6 to 17 years old). The women maintaining these families must cope with economic realities and the needs of their older children

which are no less urgent than those difficulties faced by women with younger children. These mothers are, however, relieved of some of the constant child-care requirements implicit during infancy and early childhood. Mothers who are responsible only for school-age children are seemingly in an improved position to shift their focus from the immediacy of daily child care to childrearing processes which may consume less of the mothers' time. In any event, once all the children are in school, the woman may feel that she can seek employment outside the home at least on a part-time basis without jeopardizing the care required by her children.

TENURE

Families maintained by female householders were much more likely than families in general to be in rented housing. Whereas 25 percent of all families were renters, the proportion of female householders (no husband present) who were

renters was 50 percent. About 8 percent of female householders were not only renters but were renting public housing, as compared with 2 percent of all families (table 14).

The highest proportion of renters was among the women under age 25. Whereas 86 percent of those under 25 were renters, the proportion declined among older women to the point that only 21 percent of those age 75 and over were renters.

Black and Spanish-origin women maintaining families were far more likely than their White counterparts not only to be renters, but also the renters of public housing. The proportions renting were 66 percent for Black women and 72 percent for Spanish-origin women, as compared with 43 percent for White women. Similarly, the proportions renting public housing were 19 percent for Black women, 9 percent for Spanish-origin women, and 3 percent for White women maintaining families.

Table 11. Size of Families Maintained by Female Householders With No Husband Present, by Race and Spanish Origin: 1979 and 1970

(Numbers in thousands. For meaning of symbols, see text)

Size of family	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
Total female householders, no husband present.....	8,458	100.0	5,591	100.0	2,867	51.3
2 persons.....	3,906	46.2	2,532	45.3	1,374	54.3
3 persons.....	2,287	27.0	1,337	23.9	950	71.1
4 persons.....	1,209	14.3	763	13.6	446	58.5
5 persons.....	596	7.0	440	7.9	156	35.5
6 persons.....	246	2.9	251	4.5	-5	-2.0
7 or more persons.....	214	2.5	268	4.8	-54	-20.1
Total persons.....	26,032	(X)	17,995	(X)	(X)	(X)
Persons per family.....	3.08	(X)	3.22	(X)	(X)	(X)
WHITE						
Total female householders, no husband present.....	5,918	100.0	4,165	100.0	1,753	42.1
2 persons.....	3,056	51.6	2,093	50.3	963	46.0
3 persons.....	1,643	27.8	1,049	25.2	594	56.6
4 persons.....	746	12.6	540	13.0	206	38.1
5 persons.....	299	5.1	266	6.4	33	12.4
6 persons.....	107	1.8	128	3.1	-21	-16.4
7 or more persons.....	68	1.1	89	2.1	-21	-23.6
Total persons.....	16,898	(X)	12,285	(X)	(X)	(X)
Persons per family.....	2.86	(X)	2.95	(X)	(X)	(X)
BLACK						
Total female householders, no husband present.....	2,390	100.0	1,382	100.0	1,008	72.9
2 persons.....	787	32.9	419	30.3	368	87.8
3 persons.....	608	25.4	280	20.3	328	117.1
4 persons.....	442	18.5	218	15.8	224	102.8
5 persons.....	276	11.5	172	12.4	104	60.5
6 persons.....	136	5.7	121	8.8	15	12.4
7 or more persons.....	140	5.9	172	12.4	-32	-18.6
Total persons.....	8,674	(X)	5,537	(X)	(X)	(X)
Persons per family.....	3.63	(X)	4.01	(X)	(X)	(X)
SPANISH ORIGIN¹						
Total female householders, no husband present.....	542	100.0	307	100.0	235	76.5
2 persons.....	200	36.9	93	30.3	107	115.1
3 persons.....	147	27.1	75	24.4	72	96.0
4 persons.....	100	18.4	55	17.9	45	(B)
5 persons.....	53	9.8	34	11.1	19	(B)
6 persons.....	23	4.2	22	7.2	1	(B)
7 or more persons.....	19	3.6	29	9.4	-10	(B)
Total persons.....	1,792	(X)	(NA)	(X)	(NA)	(X)
Persons per family.....	3.30	(X)	(NA)	(X)	(NA)	(X)

¹Source of 1970 Spanish-origin data: 1970 Census of Population, Family Composition, Vol. II, 4A, table 5. Persons of Spanish origin may be of any race.

Table 12. Families Maintained by Female Householders With No Husband Present, by Race, Spanish Origin, and Number of Own Children: 1979 and 1970

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
Total female householders, no husband present.....	8,458	100.0	5,591	100.0	2,867	51.3
With own children under 18.....	5,288	62.5	2,926	52.3	2,362	80.7
1 child.....	2,360	27.9	1,048	18.7	1,312	125.2
2 children.....	1,701	20.1	834	14.9	867	104.0
3 children.....	782	9.2	493	8.8	289	58.6
4 children.....	293	3.5	268	4.8	25	9.3
5 children.....	97	1.1	142	2.5	-45	-31.7
6 or more children.....	55	0.7	141	2.5	-86	-61.0
With own children under 6.....	1,926	22.8	1,110	19.9	816	73.5
1 child.....	1,471	17.4	688	12.3	783	113.8
2 children.....	384	4.5	296	5.3	88	29.7
3 or more children.....	71	0.8	126	2.3	-55	-43.7
Total own children under 18....	9,822	(X)	6,694	(X)	3,128	46.7
Children under 18 per family.....	1.16	(X)	1.20	(X)	(X)	(X)
Children under 18 per family with children.....	1.86	(X)	2.29	(X)	(X)	(X)
Total own children under 6.....	2,380	(X)	1,591	(X)	789	49.6
Children under 6 per family.....	0.28	(X)	0.28	(X)	(X)	(X)
Children under 6 per family with children.....	1.24	(X)	1.43	(X)	(X)	(X)
WHITE						
Total female householders, no husband present.....	5,918	100.0	4,165	100.0	1,753	42.1
With own children under 18.....	3,511	59.3	1,995	47.9	1,516	76.0
1 child.....	1,729	29.2	780	18.7	949	121.7
2 children.....	1,162	19.6	634	15.2	528	83.3
3 children.....	439	7.4	319	7.7	120	37.6
4 children.....	126	2.1	151	3.6	-25	-16.6
5 children.....	40	0.7	67	1.6	-27	(B)
6 or more children.....	14	0.2	44	1.0	-30	(B)
With own children under 6.....	1,154	19.5	664	15.9	490	73.8
1 child.....	923	15.6	438	10.5	485	110.7
2 children.....	200	3.4	179	4.3	21	11.7
3 or more children.....	30	0.5	46	1.1	-16	(B)
Total own children under 18....	6,025	(X)	4,103	(X)	1,922	46.8
Children under 18 per family.....	1.02	(X)	0.99	(X)	(X)	(X)
Children under 18 per family with children.....	1.72	(X)	2.06	(X)	(X)	(X)
Total own children under 6.....	1,381	(X)	908	(X)	473	52.1
Children under 6 per family.....	0.23	(X)	0.22	(X)	(X)	(X)
Children under 6 per family with children.....	1.20	(X)	1.37	(X)	(X)	(X)
BLACK						
Total female householders, no husband present.....	2,390	100.0	1,382	100.0	1,008	72.9
With own children under 18.....	1,684	70.5	912	66.0	772	84.6
1 child.....	592	24.8	261	18.9	331	126.8
2 children.....	510	21.3	197	14.2	313	158.9
3 children.....	325	13.6	171	12.3	154	90.1
4 children.....	162	6.8	114	8.2	48	42.1
5 children.....	56	2.3	74	5.4	-18	(B)
6 or more children.....	40	1.7	95	6.9	-55	-57.9
With own children under 6.....	730	30.5	437	31.6	293	67.0
1 child.....	520	21.8	243	17.6	277	114.0
2 children.....	174	7.3	116	8.4	58	50.0
3 or more children.....	36	1.5	77	5.7	-41	-53.2
Total own children under 18....	3,622	(X)	2,528	(X)	1,094	43.3
Children under 18 per family.....	1.52	(X)	1.83	(X)	(X)	(X)
Children under 18 per family with children.....	2.15	(X)	2.77	(X)	(X)	(X)
Total own children under 6.....	948	(X)	663	(X)	285	43.0
Children under 6 per family.....	0.40	(X)	0.48	(X)	(X)	(X)
Children under 6 per family with children.....	1.30	(X)	1.52	(X)	(X)	(X)

Table 12. Families Maintained by Female Householders With No Husband Present, by Race, Spanish Origin, and Number of Own Children: 1979 and 1970—Continued

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
SPANISH ORIGIN¹						
Total female householders, no husband present.....	542	100.0	307	100.0	235	76.5
With own children under 18.....	410	75.6	214	69.7	196	91.6
1 child.....	156	28.7	65	21.2	91	(B)
2 children.....	120	22.1	56	18.2	64	(B)
3 children.....	79	14.6	39	12.7	40	(B)
4 children.....	35	6.4	24	7.8	11	(B)
5 children.....	12	2.2	15	4.9	-3	(B)
6 or more children.....	9	1.6	16	5.2	-7	(B)
With own children under 6.....	200	36.9	(NA)	(NA)	(NA)	(NA)
1 child.....	137	25.2	(NA)	(NA)	(NA)	(NA)
2 children.....	52	9.6	(NA)	(NA)	(NA)	(NA)
3 or more children.....	11	2.1	(NA)	(NA)	(NA)	(NA)
Total own children under 18....	860	(X)	567	(X)	293	51.7
Children under 18 per family.....	1.59	(X)	1.85	(X)	(X)	(X)
Children under 18 per family with children.....	2.10	(X)	2.65	(X)	(X)	(X)
Total own children under 6.....	272	(X)	(NA)	(NA)	(NA)	(NA)
Children under 6 per family.....	0.50	(X)	(NA)	(NA)	(NA)	(NA)
Children under 6 per family with children.....	1.36	(X)	(NA)	(NA)	(NA)	(NA)

¹Source of 1970 Spanish-origin data: 1970 Census of Population, Family Composition, Vol. II, 4A, table 6. Persons of Spanish origin may be of any race.

Table 13. Age of Female Householders With No Husband Present, by Race and Age of Own Children: 1979 and 1970

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
All ages.....	8,458	100.0	5,591	100.0	2,867	51.3
No own children under 18.....	3,170	37.5	2,665	47.7	505	18.9
With own children under 18.....	5,288	62.5	2,926	52.3	2,362	80.7
35 years and under.....	2,929	100.0	1,364	100.0	1,565	114.7
No own children under 18.....	206	7.0	104	7.6	102	98.1
With own children under 18.....	2,723	93.0	1,260	92.4	1,463	116.1
All under 6.....	990	33.8	454	33.3	536	118.1
Some under 6, some 6 to 17.....	665	22.7	407	29.8	258	63.4
All 6 to 17.....	1,068	36.5	399	29.3	669	167.7
35 to 44 years.....	1,851	100.0	1,074	100.0	777	72.3
No own children under 18.....	235	12.7	154	14.3	81	52.6
With own children under 18.....	1,616	87.3	920	85.7	696	75.7
All under 6.....	54	2.9	23	2.1	31	(B)
Some under 6, some 6 to 17.....	196	10.6	185	17.2	11	5.9
All 6 to 17.....	1,366	73.8	712	66.3	654	91.9
45 to 64 years.....	2,481	100.0	2,021	100.0	460	22.8
No own children under 18.....	1,545	62.3	1,285	63.6	260	20.2
With own children under 18.....	936	37.7	736	36.4	200	27.2
65 years and over.....	1,196	100.0	1,131	100.0	65	5.7
No own children under 18.....	1,183	98.9	1,122	99.2	61	5.4
With own children under 18.....	13	1.1	9	0.8	4	(B)
WHITE						
All ages.....	5,918	100.0	4,165	100.0	1,753	42.1
No own children under 18.....	2,408	40.7	2,170	52.1	238	11.0
With own children under 18.....	3,511	59.3	1,995	47.9	1,516	76.0
35 years and under.....	1,834	100.0	866	100.0	968	111.8
No own children under 18.....	140	7.6	71	8.2	69	(B)
With own children under 18.....	1,694	92.4	795	91.8	899	113.1
All under 6.....	665	36.3	316	36.5	349	110.4
Some under 6, some 6 to 17.....	336	18.3	219	25.3	117	53.4
All 6 to 17.....	693	37.8	260	30.0	433	166.5
35 to 44 years.....	1,297	100.0	742	100.0	555	74.8
No own children under 18.....	150	11.6	115	15.5	35	30.4
With own children under 18.....	1,147	88.4	627	84.5	520	82.9
All under 6.....	38	2.9	9	1.2	29	(B)
Some under 6, some 6 to 17.....	103	7.9	100	13.5	3	3.0
All 6 to 17.....	1,006	77.6	518	69.8	488	94.2
45 to 64 years.....	1,821	100.0	1,599	100.0	222	13.9
No own children under 18.....	1,157	63.5	1,033	64.6	124	12.0
With own children under 18.....	664	36.5	566	35.4	98	17.3
65 years and over.....	967	100.0	957	100.0	10	1.0
No own children under 18.....	961	99.4	951	99.4	10	1.1
With own children under 18.....	6	0.6	7	0.7	-1	(B)

Table 13. Age of Female Householders With No Husband Present, by Race and Age of Own Children: 1979 and 1970—Continued

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
BLACK						
All ages.....	2,390	100.0	1,382	100.0	1,008	72.9
No own children under 18.....	706	29.5	470	34.0	236	50.2
With own children under 18.....	1,684	70.5	912	66.0	772	84.6
35 years and under.....	1,042	100.0	486	100.0	556	114.4
No own children under 18.....	58	5.6	30	6.2	28	(B)
With own children under 18.....	984	94.4	456	93.8	528	115.8
All under 6.....	309	29.7	135	27.8	174	128.9
Some under 6, some 6 to 17.....	313	30.0	182	37.4	131	72.0
All 6 to 17.....	362	34.7	139	28.6	223	160.4
35 to 44 years.....	525	100.0	327	100.0	198	60.6
No own children under 18.....	79	15.0	39	11.9	40	(B)
With own children under 18.....	446	85.0	288	88.1	158	54.9
All under 6.....	14	2.7	14	4.3	-	(B)
Some under 6, some 6 to 17.....	88	16.8	85	26.0	3	3.5
All 6 to 17.....	344	65.5	189	57.8	155	82.0
45 to 64 years.....	608	100.0	406	100.0	202	49.8
No own children under 18.....	361	59.4	240	59.1	121	50.4
With own children under 18.....	247	40.6	166	40.9	81	48.8
65 years and over.....	214	100.0	165	100.0	49	29.7
No own children under 18.....	208	97.2	162	98.2	46	28.4
With own children under 18.....	6	2.8	2	1.2	4	(B)

Table 14. Families and Female Householders With No Husband Present, by Housing Tenure, Age, Race, and Spanish Origin: 1979

(Numbers in thousands. For meaning of symbols, see text)

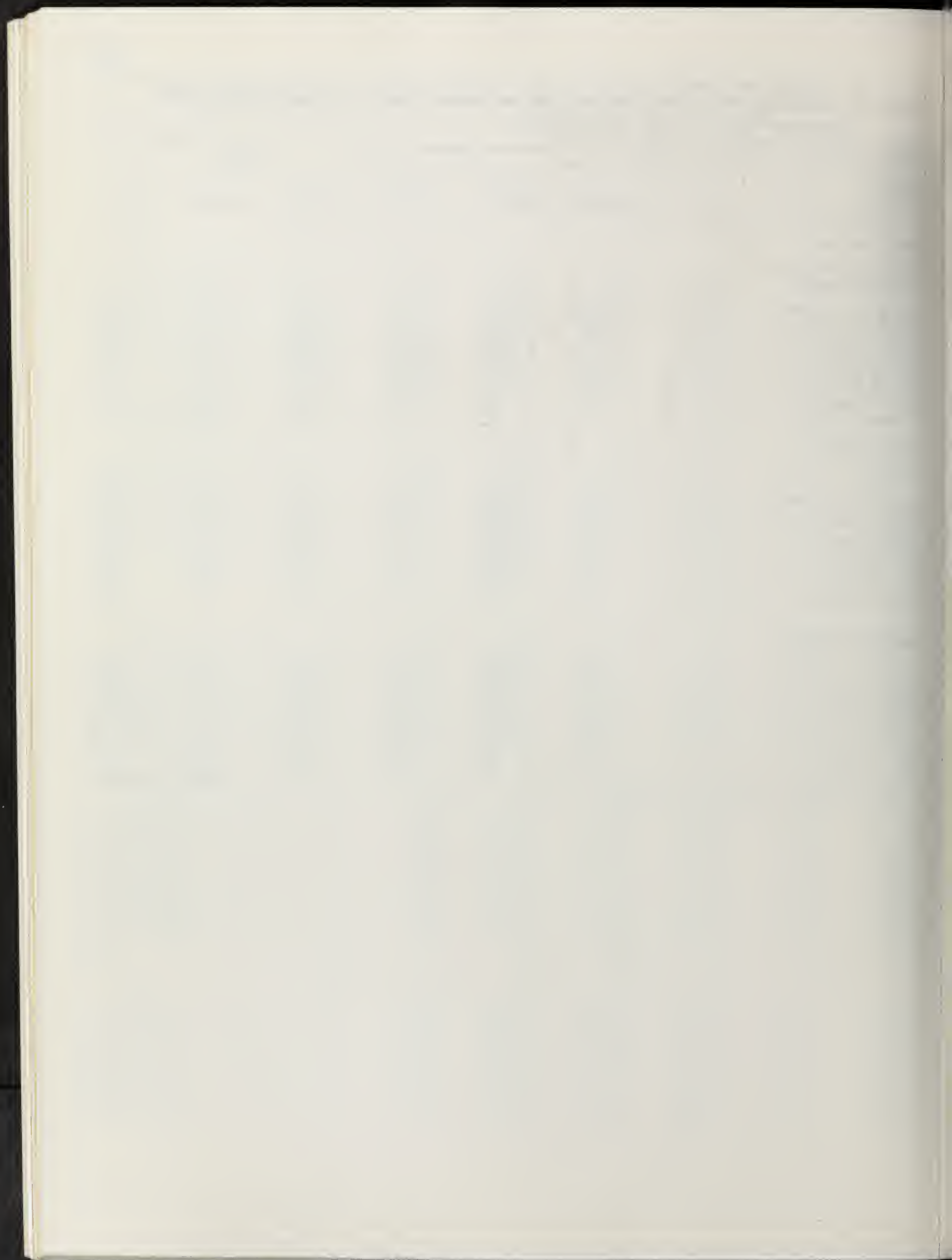
Subject	Total		Owner	Renter		
	Number	Percent		Total	Public	Private
ALL RACES						
All Families						
Total, all ages.....	57,804	100.0	74.6	25.4	2.0	23.4
Under 25 years.....	3,827	100.0	32.0	67.9	4.7	63.3
25 to 29 years.....	6,473	100.0	54.4	45.6	3.0	42.6
30 to 34 years.....	7,005	100.0	69.1	30.9	2.3	28.6
35 to 44 years.....	11,754	100.0	77.4	22.6	2.2	20.4
45 to 54 years.....	10,883	100.0	84.4	15.6	1.4	14.3
55 to 64 years.....	9,342	100.0	87.0	13.0	0.9	12.0
65 to 74 years.....	5,832	100.0	84.1	15.9	1.4	14.6
75 years and over.....	2,678	100.0	83.8	16.2	1.3	14.8
All Female Householders, No Husband Present						
Total, all ages.....	8,458	100.0	50.2	49.8	7.8	42.0
Under 25 years.....	801	100.0	14.5	85.5	13.7	71.8
25 to 29 years.....	1,016	100.0	23.8	76.2	11.5	64.7
30 to 34 years.....	1,112	100.0	38.6	61.4	8.4	53.1
35 to 44 years.....	1,851	100.0	50.4	49.7	9.2	40.4
45 to 54 years.....	1,518	100.0	63.3	36.8	5.9	30.8
55 to 64 years.....	963	100.0	70.1	30.0	5.2	24.8
65 to 74 years.....	712	100.0	70.9	29.1	3.4	25.7
75 years and over.....	484	100.0	79.5	20.5	1.0	19.4
WHITE						
All Families						
Total, all ages.....	50,910	100.0	77.6	22.4	1.1	21.4
Under 25 years.....	3,239	100.0	34.9	65.1	2.5	62.6
25 to 29 years.....	5,580	100.0	57.5	42.6	1.6	40.9
30 to 34 years.....	6,020	100.0	73.1	26.9	1.3	25.6
35 to 44 years.....	10,256	100.0	80.8	19.2	1.0	18.2
45 to 54 years.....	9,644	100.0	87.0	13.0	0.7	12.4
55 to 64 years.....	8,468	100.0	88.5	11.5	0.6	10.9
65 to 74 years.....	5,237	100.0	85.7	14.3	0.9	13.4
75 years and over.....	2,466	100.0	84.8	15.2	1.1	14.1
All Female Householders, No Husband Present						
Total, all ages.....	5,918	100.0	56.7	43.3	3.4	39.9
Under 25 years.....	468	100.0	16.9	83.1	7.1	76.1
25 to 29 years.....	647	100.0	26.4	73.6	6.0	67.5
30 to 34 years.....	719	100.0	43.5	56.5	4.2	52.3
35 to 44 years.....	1,296	100.0	57.2	42.8	3.1	39.7
45 to 54 years.....	1,105	100.0	70.5	29.5	2.8	26.7
55 to 64 years.....	716	100.0	73.9	26.1	2.5	23.5
65 to 74 years.....	559	100.0	73.9	26.1	1.6	24.5
75 years and over.....	408	100.0	80.9	19.1	0.5	18.6
BLACK						
All Families						
Total, all ages.....	5,906	100.0	52.2	47.8	9.9	37.9
Under 25 years.....	542	100.0	16.1	83.9	16.8	67.0
25 to 29 years.....	773	100.0	36.5	63.4	12.8	50.7
30 to 34 years.....	806	100.0	43.5	56.5	9.9	46.5
35 to 44 years.....	1,259	100.0	51.8	48.2	12.5	35.7
45 to 54 years.....	1,076	100.0	63.8	36.2	7.4	28.7
55 to 64 years.....	749	100.0	71.3	28.8	4.7	24.0
65 to 74 years.....	508	100.0	69.3	30.7	6.5	24.2
75 years and over.....	192	100.0	71.9	28.6	4.7	23.4

Table 14. Families and Female Householders With No Husband Present, by Housing Tenure, Age, Race, and Spanish Origin: 1979—Continued

Numbers in thousands. For meaning of symbols, see text)

Race, and Spanish Origin						
Numbers in thousands. For meaning of symbols, see text)						
Subject	Total		Owner	Renter		
	Number	Percent		Total	Public	Private
LACK--Continued						
All Female Householders, No Husband Present						
Total, all ages.....	2,390	100.0	34.4	65.6	18.6	47.0
Under 25 years.....	316	100.0	9.5	90.2	23.1	67.4
25 to 29 years.....	351	100.0	19.7	80.3	21.9	58.1
30 to 34 years.....	376	100.0	28.2	71.8	16.5	55.1
35 to 44 years.....	526	100.0	34.0	66.0	24.7	41.3
45 to 54 years.....	378	100.0	44.4	55.6	15.3	40.2
55 to 64 years.....	230	100.0	58.7	41.7	11.7	29.6
65 to 74 years.....	144	100.0	59.7	40.3	9.7	30.6
75 years and over.....	70	(B)	(B)	(B)	(B)	(B)
SPANISH ORIGIN ¹						
All Families						
Total, all ages.....	2,741	100.0	49.3	50.7	3.9	46.8
Under 25 years.....	316	100.0	18.4	81.6	4.4	77.2
25 to 29 years.....	444	100.0	32.7	67.3	2.5	64.9
30 to 34 years.....	393	100.0	45.0	54.7	4.1	50.6
35 to 44 years.....	662	100.0	55.1	44.9	4.7	40.2
45 to 54 years.....	457	100.0	62.8	37.4	4.8	32.6
55 to 64 years.....	254	100.0	72.0	28.0	3.1	24.8
65 to 74 years.....	150	100.0	62.7	37.3	2.7	34.0
75 years and over.....	65	(B)	(B)	(B)	(B)	(B)
All Female Householders, No Husband Present						
Total, all ages.....	542	100.0	27.7	72.3	8.5	63.8
Under 25 years.....	79	100.0	8.9	91.1	13.9	77.2
25 to 29 years.....	97	100.0	10.3	89.7	4.1	85.6
30 to 34 years.....	81	100.0	19.8	81.5	8.6	71.6
35 to 44 years.....	127	100.0	29.9	70.1	10.2	59.8
45 to 54 years.....	90	100.0	48.9	51.1	7.8	42.2
55 to 64 years.....	34	(B)	(B)	(B)	(B)	(B)
65 to 74 years.....	28	(B)	(B)	(B)	(B)	(B)
75 years and over.....	6	(B)	(B)	(B)	(B)	(B)

¹Persons of Spanish origin may be of any race.





Employment Characteristics

LABOR FORCE PARTICIPATION

Data published annually by the Bureau of Labor Statistics indicated that in 1979, nearly one-half of all women living with their husbands were in the labor force (i.e., either working or looking for work outside the home). The economic realities faced by most women maintaining families with no husband present provide an additional impetus for them to enter the labor force. In fact, the proportion of these women in the labor force was 60 percent (table 15) as compared with 49 percent for wives in married-couple families.

Although the labor force participation rate of women maintaining families has increased significantly since 1970, there is evidence that a higher proportion of these women had problems finding employment. The number who were involuntarily unemployed increased by 158 percent between 1970 and 1979. No one knows how many others became discouraged, stopped looking for work, and thus, did not appear in the unemployment data.

White women maintaining families were more likely than their Black counterparts to be in the labor force, and the gap between the races widened substantially during the decade. In 1979, about 62 percent of White women were in the labor force, compared with 54 percent of Black women. There was

no significant difference in 1970 between the participation rates of White and Black women.

OCCUPATION

In both 1970 and 1979, the majority of employed women maintaining families (58 and 57 percent, respectively) were clerical or service workers (table 16). There has, however, been a large increase since 1970 in the number who had either professional or managerial positions, with the number of women in each of these occupational groups doubling during the decade. In spite of these increases, only one-fifth of the employed women with the responsibility for their families were in professional or managerial positions in 1979, and able to enjoy the favorable economic benefits generally associated with such jobs.

As might be expected, the proportion of employed Black women working in either professional or managerial occupations in 1979 was much lower (12 percent) than for Whites (22 percent), but there has been a three-fold increase since 1970 in the number of Black women in these occupations. The occupational category in which most Black women were employed in both 1970 and 1979 was service work, but the proportion in this occupation group declined from 51 percent to 36 percent during the period.

**Table 15. Labor Force Status of Female Householders With No Husband Present, by Race:
1979 and 1970**

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
Total female householders, no husband present.....	8,458	100.0	5,591	100.0	2,867	51.3
In labor force.....	5,033	59.5	2,943	52.6	2,090	71.0
Employed.....	4,608	54.5	2,778	49.7	1,830	65.9
Unemployed.....	425	5.0	165	3.0	260	157.6
Not in labor force.....	3,425	40.5	2,648	47.4	777	29.3
WHITE						
Total, female householders, no husband present.....	5,918	100.0	4,165	100.0	1,753	42.1
In labor force.....	3,661	61.9	2,224	53.4	1,437	64.6
Employed.....	3,406	57.6	2,118	50.9	1,288	60.8
Unemployed.....	255	4.3	106	2.5	149	140.6
Not in labor force.....	2,257	38.1	1,941	46.6	316	16.3
BLACK						
Total female householders, no husband present.....	2,390	100.0	1,382	100.0	1,008	72.9
In labor force.....	1,284	53.7	703	50.9	581	82.6
Employed.....	1,118	46.8	650	47.0	468	72.0
Unemployed.....	166	6.9	53	3.8	113	(B)
Not in labor force.....	1,106	46.3	679	49.1	427	62.9

**Table 16. Occupation Group of Female Householders With No Husband Present, by Race:
1979 and 1970**

(Numbers in thousands. For meaning of symbols, see text)

Subject	1979		1970		Change, 1970-79	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
Total employed female householders, no husband present.....	4,608	100.0	2,778	100.0	1,829	65.8
Professional, technical, and kindred workers.....	603	13.1	299	10.8	304	101.7
Managers and administrators, except farm.....	303	6.6	149	5.4	154	103.4
Sales workers.....	214	4.6	139	5.0	75	54.0
Clerical and kindred workers.....	1,569	34.0	839	30.2	730	87.0
Craft and kindred workers.....	95	2.1	26	0.9	69	(B)
Operatives.....	677	14.7	498	17.9	179	35.9
Service workers.....	1,076	23.4	777	28.0	299	38.5
Farm related workers.....	14	0.3	29	1.0	-15	(B)
Other laborers.....	55	1.2	23	0.8	32	(B)
WHITE						
Total employed female householders, no husband present.....	3,406	100.0	2,118	100.0	1,287	60.7
Professional, technical, and kindred workers.....	480	14.1	262	12.4	218	83.2
Managers and administrators, except farm.....	269	7.9	144	6.8	125	86.8
Sales workers.....	181	5.3	125	5.9	56	44.8
Clerical and kindred workers.....	1,240	36.4	736	34.7	504	68.5
Craft and kindred workers.....	76	2.2	19	0.9	57	(B)
Operatives.....	465	13.7	351	16.6	114	32.5
Service workers.....	649	19.1	445	21.0	204	45.8
Farm related workers.....	12	0.4	25	1.2	-13	(B)
Other laborers.....	34	1.0	12	0.6	22	(B)
BLACK						
Total employed female householders, no husband present.....	1,118	100.0	650	100.0	468	72.0
Professional, technical, and kindred workers.....	104	9.3	34	5.2	70	(B)
Managers and administrators, except farm.....	29	2.6	6	0.9	23	(B)
Sales workers.....	30	2.7	14	2.2	16	(B)
Clerical and kindred workers.....	313	28.0	101	15.5	212	209.9
Craft and kindred workers.....	19	1.7	7	1.1	12	(B)
Operatives.....	194	17.4	144	22.2	50	34.7
Service workers.....	405	36.2	330	50.8	75	22.7
Farm related workers.....	2	0.2	4	0.6	-2	(B)
Other laborers.....	21	1.9	10	1.5	11	(B)



Income and Poverty Status

INCOME

The severity of the economic disadvantages with which families maintained by women must cope becomes apparent when their income level is compared with the income of families in general. The median income in 1978 of families maintained by women was \$8,540, or slightly less than one-half (48 percent) of the \$17,640 median income of families overall (table 17). In other words, a woman with no husband contributing directly to the family income can expect to have only about \$1 for essential expenses to every \$2 available to most families.

The income differential reflected by the 1978 data does not represent even a marginal improvement since 1969. The median income for all families in 1969 was \$16,790 (expressed in 1978 constant dollars to allow for inflation). Thus, the 1978 income of all families (\$17,640) had increased by \$850 (5 percent) over the 9-year period. The median in 1969 for families maintained by women, however, was \$8,580 (expressed in 1978 dollars)—and it was no higher in 1978 (\$8,540).

The median income in 1978 of families maintained by White women (\$9,910) was substantially higher than that of families maintained by their Black or Spanish-origin counterparts (\$5,890 and \$5,580, respectively). The difference in the incomes of Black and Spanish-origin women was not significant.

The 1978 family income of White women expressed as a proportion of the median income for all White families was about 54 percent; the proportion was the same for Blacks. The corresponding figure for families maintained by Spanish-origin women was only 44 percent.

Most families in the very lowest income categories are likely to be maintained by women. In 1978, about 3.2 million families had incomes of less than \$4,000 (table 18);

more than one-half (54 percent) of these very low income families were maintained by women. Among Blacks, about 80 percent of those families with incomes under \$4,000 were maintained by women with no husbands present.

At the opposite end of the income spectrum, there were about 2.1 million families whose income during 1978 was \$50,000 and over; less than 2 percent of these families were maintained by women.

AGE AND INCOME

The family income of young female householders is likely to be lower than that of similarly situated middle-aged or older women. For example, if the woman is under 25 years old, her family's median income in 1978 (\$3,950) was only one-third as high as that for families of women 55 to 64 years old (\$12,250). The family income of female householders under age 25 actually dropped by \$410 (10 percent) since 1969, once the 1969 income was adjusted for inflation (table 19). Among Blacks, the whole group of families maintained by women under the age of 45 had a decline in income since 1969, once allowances were made for inflation.

CHILDREN AND INCOME

Among families maintained by women, those with one or more children under age 18 had a much lower median income in 1978 (\$7,040) than those without children (\$11,970). The association between low income and the presence of children reflects to some extent the fact that women with children are likely to be young, and thus have yet to reach the ages usually associated with higher income levels.

The younger the children, the lower the income of families of female householders with no husband present was likely to be. The income for families with children all over the age of 6 was \$8,690 in 1978. If there was at least one

child under age 6 and one or more age 6 to 17, the income was only \$4,930 (a difference of \$3,760). If all of the children were under 6, there was some evidence that the income (\$4,500) was even lower (table 20).

POVERTY

There were 19.1 million persons living in families with incomes below the poverty level in 1978. This constituted a poverty rate of 10 percent (table 21).

About 9.3 million of the family members living below the officially defined poverty threshold (\$6,662 for a nonfarm family of four in 1978) were in families maintained by women. The poverty rate for persons in these families,

36 percent, was considerably higher than the 10 percent for persons in families overall. Although the overall poverty rate for persons in families maintained by women is high, it has decreased somewhat from 38 percent since 1969. The 1978 poverty rate for persons in families maintained by White women was 26 percent, much lower than the rate for persons in comparable Black or Spanish-origin families.

The poverty rate among children living in families maintained by women was much higher than for children in families overall (51 versus 16 percent). Among children in Spanish-origin and Black families maintained by women, the rates were 69 and 66 percent, respectively, compared with 40 percent for their White counterparts.

Table 17. Median Income of All Families and Female-Householder Families With No Husband Present, by Race and Spanish Origin: 1978 and 1969

(In 1978 dollars. Families as of March 1979 and 1970. For meaning of symbols, see text)

Subject	1978	1969	Change, 1969-78	
			Number	Percent
ALL RACES				
All families.....	\$17,640	\$16,787	\$853	5.1
Female householders, no husband present.....	\$8,537	\$8,581	\$-44	-0.5
Percent.....	48.4	51.1	(X)	(X)
WHITE				
All families.....	\$18,368	\$17,429	\$939	5.4
Female householders, no husband present.....	\$9,911	\$9,788	\$123	1.3
Percent.....	54.0	56.2	(X)	(X)
BLACK				
All families.....	\$10,879	\$10,783	\$ 96	0.9
Female householders, no husband present.....	\$5,888	\$5,946	\$-58	-1.0
Percent.....	54.1	55.1	(X)	(X)
SPANISH ORIGIN ¹				
All families.....	\$12,566	\$13,085	\$-519	-4.0
Female householders, no husband present.....	\$5,578	\$6,512	\$-934	-14.3
Percent.....	44.4	49.8	(X)	(X)

¹Source of 1969 Spanish-origin income data: 1970 Census of Population, Family Composition, Vol. II, 4A, table 15. Persons of Spanish origin may be of any race.

Table 18. Total Money Income, by Family Type and Race: 1978

(Numbers in thousands. Families as of March 1979. For meaning of symbols, see text)

Total money income	All families		Married-couple families		Female householder, no husband present	
	Number	Percent	Number	Percent	Number	Percent
ALL RACES						
Total families.....	57,804	100.0	47,692	82.5	8,458	14.6
Under \$2,000.....	1,027	100.0	473	46.1	520	50.6
\$2,000 to \$2,999.....	852	100.0	301	35.3	529	62.1
\$3,000 to \$3,999.....	1,336	100.0	617	46.2	676	50.6
\$4,000 to \$4,999.....	1,504	100.0	784	52.1	669	44.5
\$5,000 to \$5,999.....	1,711	100.0	1,091	63.8	572	33.4
\$6,000 to \$6,999.....	1,783	100.0	1,249	70.1	484	27.1
\$7,000 to \$7,999.....	1,925	100.0	1,333	69.2	524	27.2
\$8,000 to \$8,999.....	1,876	100.0	1,341	71.5	477	25.4
\$9,000 to \$9,999.....	1,859	100.0	1,400	75.3	398	21.4
\$10,000 to \$11,999.....	3,911	100.0	3,016	77.1	752	19.2
\$12,000 to \$14,999.....	5,745	100.0	4,697	81.8	853	14.8
\$15,000 to \$19,999.....	9,769	100.0	8,553	87.6	956	9.8
\$20,000 to \$24,999.....	8,392	100.0	7,621	90.8	540	6.4
\$25,000 to \$49,999.....	14,033	100.0	13,219	94.2	475	3.4
\$50,000 and over.....	2,082	100.0	1,998	96.0	35	1.7
WHITE						
Total families.....	50,910	100.0	43,636	85.7	5,918	11.6
Under \$2,000.....	751	100.0	436	58.1	293	39.0
\$2,000 to \$2,999.....	556	100.0	269	48.4	273	49.1
\$3,000 to \$3,999.....	899	100.0	507	56.4	364	40.5
\$4,000 to \$4,999.....	1,098	100.0	663	60.4	397	36.2
\$5,000 to \$5,999.....	1,375	100.0	975	70.9	361	26.3
\$6,000 to \$6,999.....	1,468	100.0	1,100	74.9	328	22.3
\$7,000 to \$7,999.....	1,608	100.0	1,177	73.2	377	23.4
\$8,000 to \$8,999.....	1,541	100.0	1,191	77.3	309	20.1
\$9,000 to \$9,999.....	1,597	100.0	1,268	79.4	283	17.7
\$10,000 to \$11,999.....	3,384	100.0	2,690	79.5	587	17.3
\$12,000 to \$14,999.....	5,073	100.0	4,244	83.7	673	13.3
\$15,000 to \$19,999.....	8,790	100.0	7,797	88.7	775	8.8
\$20,000 to \$24,999.....	7,757	100.0	7,095	91.5	461	5.9
\$25,000 to \$49,999.....	12,998	100.0	12,287	94.5	408	3.1
\$50,000 and over.....	2,015	100.0	1,936	96.1	29	1.4
BLACK						
Total families.....	5,906	100.0	3,244	54.9	2,390	40.5
Under \$2,000.....	246	100.0	28	11.4	207	84.1
\$2,000 to \$2,999.....	285	100.0	28	9.8	252	88.4
\$3,000 to \$3,999.....	409	100.0	97	23.7	296	72.4
\$4,000 to \$4,999.....	382	100.0	109	28.5	264	69.1
\$5,000 to \$5,999.....	300	100.0	92	30.7	199	66.3
\$6,000 to \$6,999.....	278	100.0	120	43.2	150	54.0
\$7,000 to \$7,999.....	288	100.0	136	47.2	138	47.9
\$8,000 to \$8,999.....	301	100.0	129	42.9	160	53.2
\$9,000 to \$9,999.....	239	100.0	113	47.3	110	46.0
\$10,000 to \$11,999.....	454	100.0	263	57.9	159	35.0
\$12,000 to \$14,999.....	588	100.0	381	64.8	169	28.7
\$15,000 to \$19,999.....	819	100.0	622	75.9	157	19.2
\$20,000 to \$24,999.....	524	100.0	428	81.7	70	13.4
\$25,000 to \$49,999.....	757	100.0	666	88.0	59	7.8
\$50,000 and over.....	35	(B)	33	(B)	2	(B)

Table 19. Median Income of Female-Householder Families With No Husband Present, by Age and Race: 1978 and 1969

(In 1978 dollars. Families as of March 1979 and 1970)

Age of householder	1978	1969	Change, 1969-78	
			Number	Percent
ALL RACES				
All female householders, no husband present, 14 years and over.....	\$8,537	\$8,581	\$-44	-0.5
14 to 24 years.....	3,953	4,367	-414	-9.5
25 to 34 years.....	6,570	6,472	98	1.5
35 to 44 years.....	9,473	8,889	584	6.6
45 to 54 years.....	11,919	10,767	1,152	10.7
55 to 64 years.....	12,251	10,964	1,287	11.7
65 years and over.....	9,584	8,873	711	8.0
WHITE				
All female householders, no husband present, 14 years and over.....	\$9,911	\$9,788	\$123	1.3
14 to 24 years.....	4,434	4,517	-83	-1.8
25 to 34 years.....	7,227	6,770	457	6.8
35 to 44 years.....	10,823	9,699	1,124	11.6
45 to 54 years.....	13,240	11,993	1,247	10.4
55 to 64 years.....	13,985	12,027	1,958	16.3
65 years and over.....	10,649	10,142	507	5.0
BLACK				
All female householders, no husband present, 14 years and over.....	\$5,888	\$5,946	\$-58	-1.0
14 to 24 years.....	3,584	4,114	-530	-12.9
25 to 34 years.....	5,463	6,003	-540	-9.0
35 to 44 years.....	6,865	7,031	-166	-2.4
45 to 54 years.....	8,020	6,762	1,258	18.6
55 to 64 years.....	7,968	6,038	1,930	32.0
65 years and over.....	5,637	4,469	1,168	26.1

Table 20. Median Income of Families, by Type, Age of Householder, and Presence and Age of Own Children: 1978

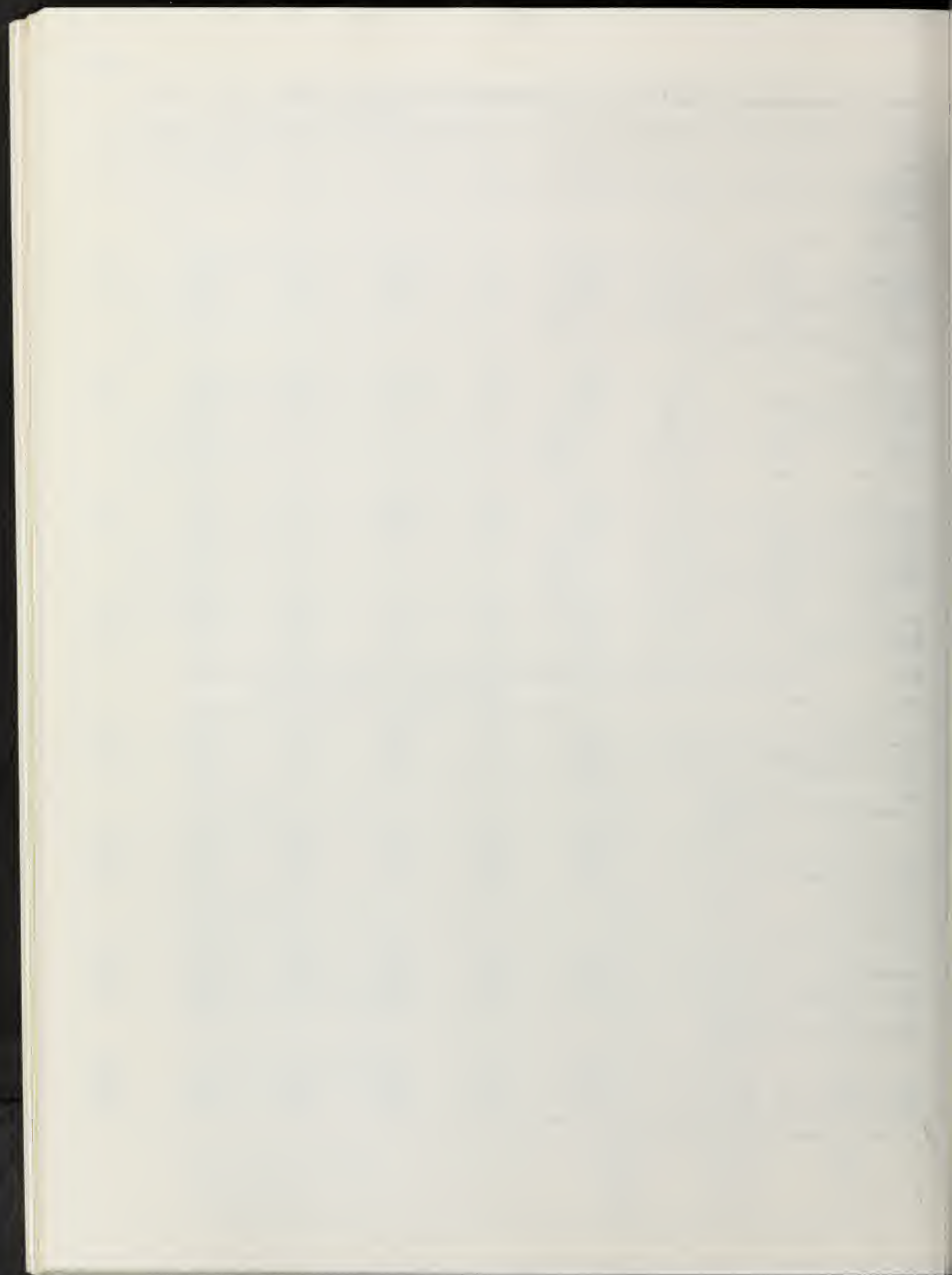
(Families as of March 1979. For meaning of symbols, see text)

Subject	All families	Married-couple families	Female householders, no husband present
All families.....	\$17,640	\$19,340	\$8,537
No own children under 18 years.....	16,956	17,808	11,970
With own children under 18 years.....	18,190	20,410	7,035
All 6 to 17 years.....	20,150	22,698	8,687
Some under 6, some 6 to 17 years.....	17,158	18,871	4,927
All under 6 years.....	15,220	16,846	4,498
Householder under 25 years.....	\$11,936	\$13,784	\$3,953
No own children under 18 years.....	15,107	15,284	10,801
With own children under 18 years.....	9,010	12,479	3,705
All 6 to 17 years.....	7,941	11,515	3,784
Some under 6, some 6 to 17 years.....	6,563	13,977	3,928
All under 6 years.....	9,298	12,446	3,653
Householder 25 to 44 years.....	\$18,700	\$20,476	\$7,792
No own children under 18 years.....	20,960	21,603	13,719
With own children under 18 years.....	18,162	20,248	7,417
All 6 to 17 years.....	19,080	21,953	8,525
Some under 6, some 6 to 17 years.....	17,288	18,929	5,040
All under 6 years.....	17,427	18,460	6,419
Householder 45 to 64 years.....	\$21,124	\$22,598	\$12,040
No own children under 18 years.....	20,716	21,855	13,686
With own children under 18 years.....	21,950	24,141	9,551
All 6 to 17 years.....	22,168	24,550	9,604
Some under 6, some 6 to 17 years.....	18,775	19,403	6,201
All under 6 years.....	18,927	19,498	3,935
Householder 65 years and over.....	\$10,141	\$10,152	\$9,584
No own children under 18 years.....	10,071	10,046	9,662
With own children under 18 years.....	13,486	14,500	5,410
All 6 to 17 years.....	13,589	14,599	5,410
Some under 6, some 6 to 17 years.....	12,619	12,619	(B)
All under 6 years.....	(B)	(B)	(B)

Table 21. Persons Below Poverty Level, by Race and Spanish Origin: 1978 and 1969
(Numbers in thousands. Persons as of March of 1979 and 1970. For meaning of symbols, see text)

Subject	1978		1969		Change, 1969-78	
	Number	Rate	Number	Rate	Number	Rate
ALL RACES						
All Persons in Families						
Total.....	19,062	10.0	19,175	10.4	-113	-0.6
Householders.....	5,280	9.1	5,008	9.7	272	5.4
Related children under 18.....	9,722	15.7	9,501	13.8	221	2.3
Other family members.....	4,060	5.7	4,667	7.2	-607	-13.0
Persons in Families With Female Householders, No Husband Present						
Total.....	9,269	35.6	6,879	38.2	2,390	34.7
Householders.....	2,654	31.4	1,827	32.7	827	45.3
Related children under 18.....	5,687	50.6	4,247	54.4	1,440	33.9
Other family members.....	928	14.6	805	17.5	123	15.3
WHITE						
All Persons in Families						
Total.....	12,050	7.3	12,623	7.8	-573	-4.5
Householders.....	3,523	6.9	3,575	7.7	-52	-1.5
Related children under 18.....	5,674	11.0	5,667	9.7	7	0.1
Other family members.....	2,853	4.5	3,381	5.8	-528	-15.6
Persons in Families With Female Householders, No Husband Present						
Total.....	4,371	25.9	3,577	29.1	794	22.2
Householders.....	1,391	23.5	1,069	25.7	322	30.1
Related children under 18.....	2,627	39.9	2,068	45.2	599	27.0
Other family members.....	353	8.1	440	12.4	-87	-19.8
BLACK						
All Persons in Families						
Total.....	6,493	29.5	6,245	30.9	248	4.0
Householders.....	1,622	27.5	1,366	27.9	256	18.7
Related children under 18.....	3,781	41.2	3,677	39.6	104	2.8
Other family members.....	1,091	15.7	1,202	20.0	-111	-9.2
Persons in Families With Female Householders, No Husband Present						
Total.....	4,712	54.2	3,225	58.2	1,487	46.1
Householders.....	1,208	50.6	737	53.3	471	63.9
Related children under 18.....	2,948	66.4	2,137	68.2	811	38.0
Other family members.....	556	29.9	350	34.4	206	58.9
SPANISH ORIGIN¹						
All Persons in Families						
Total.....	2,343	20.9	(NA)	(NA)	(NA)	(NA)
Householders.....	559	20.4	(NA)	(NA)	(NA)	(NA)
Related children under 18.....	1,354	27.2	(NA)	(NA)	(NA)	(NA)
Other family members.....	429	12.3	(NA)	(NA)	(NA)	(NA)
Persons in Families With Female Householders, No Husband Present						
Total.....	1,024	56.4	(NA)	(NA)	(NA)	(NA)
Householders.....	288	53.1	(NA)	(NA)	(NA)	(NA)
Related children under 18.....	663	68.9	(NA)	(NA)	(NA)	(NA)
Other family members.....	74	23.6	(NA)	(NA)	(NA)	(NA)

¹Persons of Spanish origin may be of any race.





Appendix A.

Definitions and Explanations

Coverage. The population in this report includes the civilian noninstitutional population of the United States plus approximately 824,000 members of the Armed Forces in the United States living off post or with their families on post in 1979, but excludes all other members of the Armed Forces.

Symbols. A dash (—) represents zero or rounds to zero. The symbol "B" means that the base for the derived figure is less than 75,000. An "X" means not applicable, and "NA" means not available.

Rounding of estimates. Individual figures are rounded to the nearest thousand without being adjusted to group totals, which are independently rounded; percentages are based on the unrounded numbers.

Head versus householder. In the 1980 census, the Bureau of the Census plans to discontinue the use of the terms "head of household" and "head of family." Instead, the terms "householder" and "family householder" are likely to be used. Recent social changes have resulted in greater sharing of household responsibilities among the adult members and, therefore, have made the term "head" increasingly inappropriate in the analysis of household and family data. Specifically, the Bureau is reconsidering its longtime practice of always classifying the husband as the head when he and his wife are living together.

In this report, the term "householder" is used for the purpose of acquainting users of census data with the new concept. The user is cautioned that the term "householder," refers to the "family head," as defined in earlier reports. For example, the data for "female householders, no husband present" include a relatively small number of women maintaining "secondary families" (i.e., "unrelated subfamilies"; see secondary family definition) who are not actually

"householders." The number of such families in 1979 was 238,000 as compared with 91,000 in 1970.

In the 1980 census, the householder is to be the first adult household member listed on the census questionnaire. The instructions call for listing first the person (or one of the persons) in whose name the home is owned or rented. If a home is owned jointly by a married couple, either the husband or the wife may be listed first, thereby becoming the reference person, or householder, to whom the relationship of other household members is to be recorded. Thus, the Bureau plans to publish the responses on relationships as given in the 1980 census, except in selected tables where the husband will always be shown as the householder in order to maintain comparability with previous census classifications.

Tenure. A housing unit is "owner occupied" if the owner or co-owner lives in the unit, even if it is mortgaged or not fully paid for. A cooperative or condominium unit is "owner occupied" only if the owner or co-owner lives in it. All other occupied units are classified as "renter occupied," including units rented for cash rent and those occupied without payment of cash rent.

Marital status. The marital status classification identifies four major categories; single, married, widowed, and divorced. These terms refer to the marital status at the time of the enumeration.

The category "married" is further divided into "married, spouse present," "separated," and "other married, spouse absent." A person was classified as "married, spouse present" if the husband or wife was reported as a member of the household, even though he or she may have been temporarily absent on business or on vacation, visiting, in a hospital, etc., at the time of the enumeration. Persons reported as separated included those with legal separations, those living apart with

intentions of obtaining a divorce, and other persons permanently or temporarily separated because of marital discord. The group "other married, spouse absent" includes married persons living apart because either the husband or wife was employed, and living at a considerable distance from home, was serving away from home in the Armed Forces, had moved to another area, or had a different place of residence for any other reason except separation as defined above.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room, is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants.

A household includes the related family members and all the unrelated persons, if any, such as lodgers, foster children, wards, or employees, who share the housing unit. A person living alone in a housing unit, or a group of unrelated persons sharing a housing unit as partners, is also counted as a household. The count of households excludes group quarters.

Family. The term "family," as used here, refers to a group of two persons or more related by birth, marriage, or adoption and residing together; all such persons are considered as members of one family. A lodger and his/her spouse who are not related to the person or persons who maintain the household, or a resident employee and his/her spouse living in, are considered as a separate family. Thus, a household may contain more than one family. However, if the son of the person or couple who maintains the household and the son's wife are members of the household, they are treated as part of the parent's family. A person maintaining a household alone, or with unrelated persons only, is regarded as a household but not as a family. Thus, some households do not contain a family.

Primary family. A primary family is a family that includes among its members the person or couple who maintains the household.

Secondary family. A secondary family (i.e., unrelated subfamily) is a family that does not include among its members the person or couple who maintains the household, or any persons related to the person or couple who maintains the household. Members of secondary families may include persons such as guests, lodgers, or resident employees and their relatives living in a household.

Persons living with relatives in group quarters were formerly considered as members of secondary families. However, the number of such families became so small (37,000 in 1967) that beginning with data for 1968 (and beginning with census data for 1960) the Bureau of the Census includes persons in these families in the count of secondary individuals.

Subfamily. A subfamily (i.e., related subfamily) is a married couple with or without children, or one parent with one or more own single children under 18 years old, living in a household and related to, but not including, the person or couple who maintains the household. The most common example of a subfamily is a young married couple sharing the home of the husband's or wife's parents. Members of a subfamily are also members of a primary family. The number of subfamilies, therefore, is not included in the number of families.

Unrelated individuals. Unrelated individuals are persons (other than inmates of institutions) who are not living with any relatives. An unrelated individual may be (1) a person living alone or with nonrelatives only, (2) a lodger or resident employee with no relatives in the household, or (3) a group quarters member who has no relatives living with him/her. Thus, a widow who occupies her house alone or with one or more other persons not related to her, a roomer not related to anyone else in the housing unit, a maid living as a member of her employer's household but with no relatives in the household, and a resident staff member in a hospital living apart from any relatives are all examples of unrelated individuals.

Primary individual. A primary individual (i.e., nonfamily householder) is a person maintaining a household while living alone or with nonrelatives only.

Secondary individual. A secondary individual is a person in a household or group quarters such as a guest, lodger, or resident employee (excluding primary individuals and inmates of institutions) who is not related to any other person in the household or group quarters. (See section above on secondary family for slight change in coverage of secondary individuals in 1968.)

Own children and related children. "Own" children in a family are sons and daughters, including stepchildren and adopted children, of the householder. Similarly, own children in a subfamily are sons and daughters of the married couple or parent in the subfamily. "Related" children in a family include own children and all other children in the household who are related to the householder by birth, marriage, or adoption. All children shown as members of subfamilies are own children. For each type of family unit identified in the CPS, the count of own children under 18 years old is limited to single (never married) children.

The count of related children in families was formerly restricted to single (never married) children. However, beginning with data for 1968 the Bureau of the Census includes ever-married children under the category of related children. This change added approximately 20,000 children to the category of related children in March 1968.

Years of school completed. In this report, data on years of school completed were derived from the combination of answers to two questions, (a) "What is the highest grade of

school that the person has attended?" and (b) "Did the person finish this grade?"

The questions on educational attainment applied only to progress in "regular" schools. Such schools include public, private, and parochial elementary and high schools (both junior and senior high), colleges, universities, and professional schools, whether day schools or night schools. Thus "regular" schooling is that which advances a person toward an elementary or high school diploma, or a college, university, or professional school degree. Schooling in other than regular schools was counted only if the credits obtained were regarded as transferable to a school in the regular school system.

Labor force and employment status. The definitions of labor force and employment status in this report related to the population 14 years old and over.

Employed. Employed persons comprise (1) all civilians who, during the specified week, did any work at all as paid employees or in their own business or profession, or on their own farm, or who worked 15 hours or more as unpaid workers on a farm or in a business operated by a member of the family, and (2) all those who were not working but who had jobs or businesses from which they were temporarily absent because of illness, bad weather, vacation, or labor-management dispute, or because they were taking time off for personal reasons, whether or not they were paid by their employers for time off, and whether or not they were seeking other jobs. Excluded from the employed group are persons whose only activity consisted of work around the house (such as own home housework, painting or repairing own home, etc.) or volunteer work for religious, charitable, and similar organizations.

Unemployed. Unemployed persons are those civilians who, during the survey week, had no employment but were available for work and (1) had engaged in any specific job-seeking activity within the past 4 weeks, such as registering at a public or private employment office, meeting with prospective employers, checking with friends or relatives, placing or answering advertisements, writing letters of application, or being on a union or professional register; (2) were waiting to be called back to a job from which they had been laid off; or (3) were waiting to report to a new wage or salary job within 30 days.

Labor force. Persons are classified as in the labor force if they were employed as civilians, unemployed, or in the Armed Forces during the survey week. The "civilian labor force" is comprised of all civilians classified as employed or unemployed.

Not in the labor force. All civilians who are not classified as employed or unemployed are defined as "not in the labor force." This group who are neither employed nor seeking work includes persons engaged only in own home housework, attending school, or unable to work because of long-

term physical or mental illness; persons who are retired or too old to work, seasonal workers for whom the survey week fell in an off season, and the voluntary idle. Persons doing only unpaid family work (less than 15 hours) are also classified as not in the labor force.

Occupation. The data on occupation of employed persons refer to the civilian job held during the survey week. Persons employed at two or more jobs were reported in the job at which they worked the greatest number of hours during the week.

The occupation groupings used here are mainly the major groups used in the 1970 Census of Population. The composition of these groups is shown in Volume 1, *Characteristics of the Population*, Part 1, United States Summary, chapter D. The categories used are either detailed classifications or combinations thereof.

Metropolitan-nonmetropolitan residence. The population residing in standard metropolitan statistical areas (SMSA's) constitutes the metropolitan population. Except in New England, an SMSA is a county or group of contiguous counties which contains at least one city of 50,000 inhabitants or more, or "twin cities" with a combined population of at least 50,000. In addition to the county, or counties, containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central county. In New England SMSA's consist of towns and cities, rather than counties. The metropolitan population in this report is based on SMSA's as defined in the 1970 census and does not include any subsequent additions or changes.

Central cities. Each SMSA must include at least one central city, and the complete title of an SMSA identifies the central city or cities. If only one central city is designated, then it must have 50,000 inhabitants or more. The area title may include, in addition to the largest city, up to two city names on the basis and in the order of the following criteria: (1) The additional city has at least 250,000 inhabitants or (2) the additional city has a population of one-third or more of that of the largest city and a minimum population of 25,000. An exception occurs where two cities have contiguous boundaries and constitute, for economic and social purposes, a single community of at least 50,000, the smaller of which must have a population of at least 15,000.

Age. The age classification is based on the age of the person at the person's last birthday.

Race. The population is divided into three groups on the basis of race: White, Black, and "other races." The last category includes Indians, Japanese, Chinese, and any other race except White and Black.

Persons of Spanish origin. Persons of Spanish origin were determined on the basis of a question that asked for self-

identification of the person's origin or descent. Respondents were asked to select their origin (or the origin of some other household member) from a "flash card" listing ethnic origins. Persons of Spanish origin, in particular, were those who indicated that their origin was Mexican, Puerto Rican, Cuban, Central or South American, or some other Spanish origin. Persons of Spanish origin may be of any race.

Income. Data on income cover money income only, prior to deduction for taxes, received from such sources as wages or salaries, net income from self-employment, Social Security, dividends, interest, public assistance and welfare, unemployment compensation, government pensions, and veterans payments. Certain money receipts such as capital gains are

not included. For a more detailed explanation, see Bureau of the Census, Current Population Reports, Series P-60, No. 123.

Poverty. Families and persons are classified as being above or below the poverty level using the poverty index adopted by a Federal Interagency Committee in 1969. This index is based on the Department of Agriculture's 1961 Economy Food Plan and reflects the different consumption requirements of families based on their size and composition, sex and age of the family householder, and farm-nonfarm residence. The poverty thresholds are updated every year to reflect changes in the Consumer Price Index (CPI). For a more detailed explanation, see Bureau of the Census, Current Population Reports, Series P-60, No. 124.



Appendix B.

Source and Reliability of the Estimates

SOURCE OF DATA

Most of the estimates in this report are based on data obtained from the Current Population Survey (CPS) of the Bureau of the Census. Some data, as footnoted in the tables were obtained from the 1970 Census of Population. The 1976 State data shown in the report was obtained from the Survey of Income and Education. Brief descriptions of the sources from and procedures by which data were obtained are presented below.

Current Population Survey (CPS). The CPS estimates in this report are based on data obtained in March of 1970 and 1979. The monthly CPS deals mainly with labor force data for the civilian noninstitutional population. Questions relating to labor force participation are asked about each member 14 years old and older in each sample household. In addition, supplementary questions are asked each March about household and family characteristics. In order to obtain more reliable data for the Spanish-origin population, the March CPS sample was enlarged to include all households from the November sample which contained at least one person of Spanish origin. This resulted in almost doubling the number of sample persons of Spanish origin. For this report, persons

in the Armed Forces living off post or with their families on post are included.

The present CPS sample was initially selected from the 1970 census file and is continuously updated to reflect new construction. (See the section, "Nonsampling variability.") The monthly CPS sample is spread over 614 areas with coverage in each of the 50 States and the District of Columbia. The CPS sample areas comprised 1,113 counties, independent cities, and divisions in the nation.

Previous sample designs used were based on files from the most recently completed census updated for new construction. The following table provides a description of some aspects of the CPS sample designs in use during the referenced data collection periods.

The estimation procedure used in this survey involved the inflation of the weighted sample results to independent estimates of the total civilian noninstitutional population of the United States by age, race, and sex. These independent estimates were based on statistics from decennial censuses; statistics on births, deaths, immigration, and emigration; and statistics on the strength of the Armed Forces. For this report, persons in the Armed Forces living off post or with their families on post were also included. The estimation

Description of the Current Population Survey for the March Supplement

Time period	Number of sample areas ¹	Households eligible		Housing units visited, not eligible ²
		Interviewed	Not interviewed	
March 1979.....	614	54,000	2,500	10,000
March 1970.....	449	48,000	2,000	8,500

¹These areas were chosen to provide coverage in each State and the District of Columbia.

²These are housing units which were visited, but were found to be vacant or otherwise not eligible for interview.

procedure for the data in the report also involved a further adjustment so that husband and wife of a household received the same weight.

Survey of Income and Education (SIE). The SIE estimates in this report are based on data collected from personal interviews conducted mostly in May and June of 1976 with a small number occurring in April and July. This survey was conducted by the Bureau of the Census acting as collection agent for the Department of Health, Education, and Welfare. Approximately 158,500 households, selected independently in the 50 States and the District of Columbia, were eligible for interview in SIE. Of this number, 7,300 interviews were not obtained because the occupants were temporarily absent, refused to be interviewed, or, after repeated callbacks, no one could be found at home. In addition to the 158,500 households, there were about 33,000 sample units which were visited and found to be vacant, condemned, unfit, demolished, etc. and therefore were ineligible for interview.

Decennial Census of Population. Descriptions of the samples from the decennial census data for 1970 in this report, as footnoted, can be found in the appropriate census publications.

RELIABILITY OF THE ESTIMATES

Since the CPS estimates in this report are based on a sample, they may differ somewhat from the figures that would have been obtained if a complete census had been taken using the same questionnaires, instructions, and enumerators. There are two types of errors possible in an estimate based on a sample survey: sampling and nonsampling. The standard errors provided for this report primarily indicate the magnitude of the sampling errors. They also partially measure the effect of some nonsampling errors in response and enumeration, but do not measure any systematic biases in the data. The full extent of the nonsampling error is unknown. Consequently, particular care should be exercised in the interpretation of figures based on a relatively small number of cases or on small differences between estimates.

Nonsampling variability. Nonsampling errors can be attributed to many sources, e.g., inability to obtain information about all cases in the sample, definitional difficulties, differences in the interpretation of questions, inability or unwillingness on the part of respondents to provide correct information, inability to recall information, errors made in collection such as in recording or coding the data, errors made in processing the data, errors made in estimating values for missing data, and failure to represent all units with the sample (undercoverage).

Undercoverage in the CPS results from missed housing units and missed persons within sample households. Overall undercoverage, as compared to the level of the decennial census, is about 5 percent. It is known that CPS undercoverage varies with age, sex, and race. Generally, undercoverage is larger for males than for females and larger for Blacks and other races than for Whites. Ratio estimation to

independent age-sex-race population controls, as described previously, partially corrects for the bias due to survey undercoverage. However, biases exist in the estimates to the extent that missed persons in missed households or missed persons in interviewed households have different characteristics than interviewed persons in the same age-sex-race group. Further, the independent population controls used have not been adjusted for undercoverage in the 1970 census, which was estimated at 2.5 percent of the population, with similar undercoverage differentials by age, sex, and race as in CPS.

A coverage improvement sample was included in computing the estimates beginning in October 1978 in order to provide coverage of mobile homes and new construction housing units that previously had no chance for selection. This sample is composed of approximately 450 sample household units which represent 237,000 occupied mobile homes and 600,000 new construction units. These new construction units are composed of those units where building permits were issued prior to January 1970 and construction was not completed by the time of the 1970 Census (i.e., April 1970). The extent of other sources of undercoverage of housing units is unknown but believed to be small.

Sampling variability. The standard errors given in the following tables are primarily measures of sampling variability, that is, of the variations that occurred by chance because a sample rather than the entire population was surveyed. The sample estimate and its estimated standard error enables one to construct confidence intervals, ranges that would include the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under essentially the same general conditions and using the same sample design, and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples.
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples.
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

The average estimate derived from all possible samples is or is not contained in any particular computed interval. However, for a particular sample, one can say with a specified confidence that the average estimate derived from all possible samples is included in the confidence interval.

All the statements of comparison appearing in the text are significant at a 1.6 standard error level or better, and most are significant at a level of more than 2.0 standard errors.

his means that for most differences cited in the text, the estimated difference is greater than twice the standard error of the difference. Statements of comparison qualified in some way (e.g., by use of the phrase, "some evidence") have level of significance between 1.6 and 2.0 standard errors.

Comparability with other data. Data obtained from CPS and SIE are not entirely comparable. This is due in large part to differences in interviewer training and experience and in differing survey processes. This is an additional component of error not reflected in the standard error tables. Therefore, caution should be used in comparing results between these different sources.

Caution should also be exercised in comparing metropolitan and nonmetropolitan area estimates from 1976 and later years to each other and to those from earlier years. Methodological and sample design changes have occurred in these years resulting in relatively large differences in the metropolitan and nonmetropolitan area estimates.

Note when using small estimates. Summary measures (such as averages and percent distributions) are shown in the report only when the base of the measure is 75,000 or greater. Because of the large standard errors involved, there is little chance that summary measures would reveal useful information when computed on a smaller base. Estimated numbers are shown, however, even though the relative standard errors of these numbers are larger than those for corresponding percentages. These smaller estimates are provided primarily to permit such combinations of the categories as serve each user's need.

Standard errors for data based on the decennial census. Sampling errors on all data from the 5-percent sample of the 1970 decennial census shown in this report are small enough to be disregarded. However, the standard errors may be found in the appropriate census volumes.

Standard errors for data based on SIE. The tables in the report based on SIE data are footnoted to a previously published report. Due to lack of space in this report, the standard errors are not included. However, standard errors can be obtained from the earlier report.

Standard error tables and their use. In order to derive standard errors that would be applicable to a large number of estimates and could be prepared at a moderate cost, a number of approximations were required. Therefore, instead of providing an individual standard error for each estimate, generalized sets of standard errors are provided for various types of characteristics. As a result, the sets of standard errors provided give an indication of the order of magnitude of the standard error of an estimate rather than the precise standard error.

The figures in tables B-1 and B-2 provide approximations to standard errors of estimated numbers and estimated percentages. Standard errors for intermediate values not shown in the generalized tables of standard errors may be

approximated by linear interpolation. Estimated standard errors for specific characteristics cannot be obtained from tables B-1 or B-2 without the use of factors in table B-3. These factors must be applied to the generalized standard errors in order to adjust for the combined effect of sample design and estimating procedure on the value of the characteristic.

Two parameters (denoted "a" and "b") are used to calculate standard errors for each type of characteristic; they are presented in table B-4. These parameters were used to calculate the standard errors in tables B-1 and B-2, and to calculate the factors in table B-3. They also may be used to directly calculate the standard errors for estimated numbers and percentages. Methods for direct computation are given in the following sections.

Standard errors of estimated numbers. The approximate standard error, σ_x , of an estimated number shown in this report can be obtained in two ways. It may be obtained by use of the formula

$$\sigma_x = f\sigma \quad (1)$$

where f is the appropriate factor from table B-3, and σ is the standard error on the estimate obtained by interpolation from table B-1. Alternatively, standard errors may be approximated by the following formula (2) from which the standard errors were calculated in table B-1. Use of this formula will provide more accurate results than the use of formula (1) above.

$$\sigma_x = \sqrt{ax^2 + bx} \quad (2)$$

Here x is the size of the estimate and a and b are the parameters in table B-4 associated with the particular type of characteristic.

Standard errors of estimated percentages. The reliability of an estimated percentage, computed using sample data for both numerator and denominator, depends upon both the size of the percentage and the size of the total upon which the percentage is based. Estimated percentages are relatively more reliable than the corresponding estimates of the numerators of the percentages, particularly if the percentages are 50 percent or more. When the numerator and denominator of the percentage are in different categories, use the factor or parameters from table B-3 or B-4 indicated by the numerator. The approximate standard error, $\sigma_{(x,p)}$, of an estimated percentage can be obtained by use of the formula

$$\sigma_{(x,p)} = f\sigma \quad (3)$$

In this formula f is the appropriate factor from table B-3 and σ is the standard error on the estimate from table B-2. Alternatively, standard errors may be approximated by formula (4), from which standard errors in table B-2 were calculated; direct computation will give more accurate results than use of the standard error tables and the factors.

$$\sigma_{(x,p)} = \sqrt{\frac{b}{x} \cdot p(100 - p)} \quad (4)$$

Here x is the size of the subclass of families, households, or householders which is the base of the percentage, p is the percentage ($0 \leq p \leq 100$), and b is the parameter in table B-4 associated with the particular type of characteristic in the numerator of the percentage.

Illustration of the use of standard error tables. Table 8 shows that in 1979, there were 8,458,000 female householders 14 years old and over with no husband present. Table B-1 shows the standard error on an estimate of this size to be approximately 106,000. Applying the appropriate factor from table B-3 and using formula (1) the approximate standard error is $1.0 \times 106,000 = 106,000$.¹ The 68-percent confidence interval as shown by the data is from 8,352,000 to 8,564,000. Therefore, a conclusion that the average estimate derived from all possible samples lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. Similarly we could conclude with 95-percent confidence that the average estimate derived from all possible samples lies within the interval from 8,246,000 to 8,670,000, i.e., $8,458,000 \pm (2 \times 106,000)$.

Of these 8,458,000 female householders, 4,780,000 or 56.5 percent were women under 45 years old. Using formula (4) and table B-4, the standard error on an estimate of 56.5 percent is

$$\sqrt{\frac{1389}{8,458,000}} (56.5) (100 - 56.5) = 0.6 \text{ percent}^2$$

Consequently, the chances are 68 out of 100 that the estimated 56.5 percent would be within 0.6 percentage points of the average of all possible samples. Chances are 95 out of 100 that the estimate would be within 1.2 percentage points of all possible samples, i.e., the 95-percent confidence interval would be from 55.3 to 57.7 percent.

Standard error of a difference. For a difference between two sample estimates, the standard error is approximately equal to

$$\sigma_{(x-y)} = \sqrt{\sigma_x^2 + \sigma_y^2} \quad (5)$$

where σ_x and σ_y are the standard errors of the estimates x and y ; the estimates can be of numbers, percents, ratios, etc. This will represent the actual standard error quite accurately for the difference between two estimates of the same characteristic in two different areas, or for the difference between separate and uncorrelated characteristics in the same area. If, however, there is a high positive (negative) correlation between the two characteristics, the formula will overestimate (underestimate) the true standard error.

¹ Formula (2) for this example with $a = -0.000010$ and $b = 1389$ gives a standard error of 105,000.

² Table B-2, B-3 and formula (3) also give a standard error of 0.6 percent.

Illustration of the computation of the standard error of a difference between estimates. Table 8 shows that in 1970, there were 5,591,000 female householders 14 years old and over with no husband present. Tables B-1 and B-3 show the standard error on an estimate of that size to be approximately 86,000. The apparent difference between the number of female householders 14 years old and over with no husband present in 1970 and 1979 is 2,867,000. The standard error on 8,458,000 is 106,000 as shown above. Therefore, use formula (5), the standard error of the estimated difference of 2,867,000 is about

$$136,000 = \sqrt{(106,000)^2 + (86,000)^2}$$

This means that the chances are 68 out of 100 that the estimated difference based on the sample estimates would vary from the difference derived from the average of all possible samples by less than 136,000. The 68-percent confidence interval about the 2,867,000 difference is from 2,731,000 to 3,003,000, i.e., $2,867,000 \pm 136,000$. A conclusion that the average estimate of the difference derived from all possible samples of the same size and design lies within a range computed in this way would be correct for roughly 68 percent of all possible samples. The 95-percent confidence interval is from 2,595,000 to 3,139,000. Since this interval does not contain zero, we can conclude with 95-percent confidence that the number of female householders 14 years old and over with no husband present in 1979 was actually greater than the female householders in 1970.

Standard error of a ratio. All mean values for persons in families shown in the tables of this report were calculated as the ratio of two numbers. For example, the mean number of own children under 18 per family is calculated by

$$\frac{x}{y} = \frac{\text{total number of own children under 18}}{\text{total number of family householders with own children}}$$

The denominator, y , of the ratio always represents a count of family householders of a certain class. The numerator, x , represents a count of persons with the characteristic under consideration who are members of these families; this count may be 0, 1, 2, 3 or more. Standard errors for these means may be approximated using the following formula:

$$\sigma_{\frac{x}{y}} = \sqrt{\left(\frac{x}{y}\right)^2 \left[\left(\frac{\sigma_y}{y}\right)^2 + \left(\frac{\sigma_x}{x}\right)^2 \right]} \quad (6)$$

The standard error of the estimated number of family householders, σ_y , and the standard error of the estimated number of persons with the characteristic in those families, σ_x , may be calculated by methods described above.

Standard error of a median. The sampling variability of an estimated median depends upon the form of the distribution as well as the size of its base. An approximate method for measuring the reliability of a median is to determine an

interval about the estimated median, such that there is a stated degree of confidence that the median based on a complete census lies within the interval. The following procedure may be used to estimate the 68-percent confidence limits of the median based on sample data.

Determine, using the standard error tables and factors or formula (4), the standard error of the estimate of 50 percent from the distribution.

Add to and subtract from 50 percent the standard error determined in step (1).

Using the distribution of the characteristic, calculate the confidence interval corresponding to the two points established in step (2).

A 95-percent confidence interval may be determined by finding the values corresponding to 50 percent plus and minus twice the standard error determined in step (1).

Illustration of the computation of a confidence interval for the median. Table 8 of this report shows that the median age in 1979 of female householders with no husband present was 34.6 years. The base of the distribution from which the median was determined is 8,458,000 persons.

1. Table B-2 and factor table B-3 show the standard error of 50 percent on a base of 8,458,000 is about 0.7 percent.

2. To obtain a 95-percent confidence interval on an estimated median add to and subtract from 50 percent twice the standard error found in step 1. This yields percentage limits 48.6 and 51.4.

3. From table 8 it can be seen that 34.6 percent of all female householders with no husband present were younger than 35 years and 21.9 percent were 35 to 44 years old. By linear interpolation, the lower limit of the estimate is found to be about

$$35.0 + (45.0 - 35.0) \left(\frac{48.6 - 34.6}{21.9} \right) = 41.4$$

Similarly, the upper limit may be found by linear interpolation to be about

$$35.0 + (45.0 - 35.0) \left(\frac{51.4 - 34.6}{21.9} \right) = 42.7$$

Thus, the 95-percent confidence interval for the median age of female householders with no husband present is 41.4 to 42.7 years.

Table B-1. Standard Errors of Estimated Numbers—CPS Estimates

(68 chances out of 100. Numbers in thousands)

Size of estimate	Standard error	Size of estimate	Standard error
5.....	6	2,500.....	58
10.....	8	5,000.....	82
100.....	12	10,000.....	117
500.....	19	25,000.....	169
1,000.....	26	50,000.....	211
5,000.....	37		

Table B-2. Standard Errors of Estimated Percentages—CPS Estimates

(68 chances out of 100)

Base of percentage (in thousands)	Estimated percentage					
	1 or 99	2 or 98	5 or 95	10 or 90	25 or 75	50
75.....	1.4	1.9	3.0	4.1	5.9	6.8
100.....	1.2	1.6	2.6	3.5	5.1	5.9
250.....	0.7	1.0	1.6	2.2	3.2	3.7
500.....	0.5	0.7	1.1	1.6	2.3	2.6
1,000.....	0.4	0.5	0.8	1.1	1.6	1.9
2,500.....	0.2	0.3	0.5	0.7	1.0	1.2
5,000.....	0.2	0.2	0.4	0.5	0.7	0.8
10,000.....	0.12	0.2	0.3	0.4	0.5	0.6
25,000.....	0.07	0.10	0.2	0.2	0.3	0.4
50,000.....	0.05	0.07	0.11	0.2	0.2	0.3

Table B-3. Factors to be Applied to Generalized Standard Errors in Tables B-1 and B-2

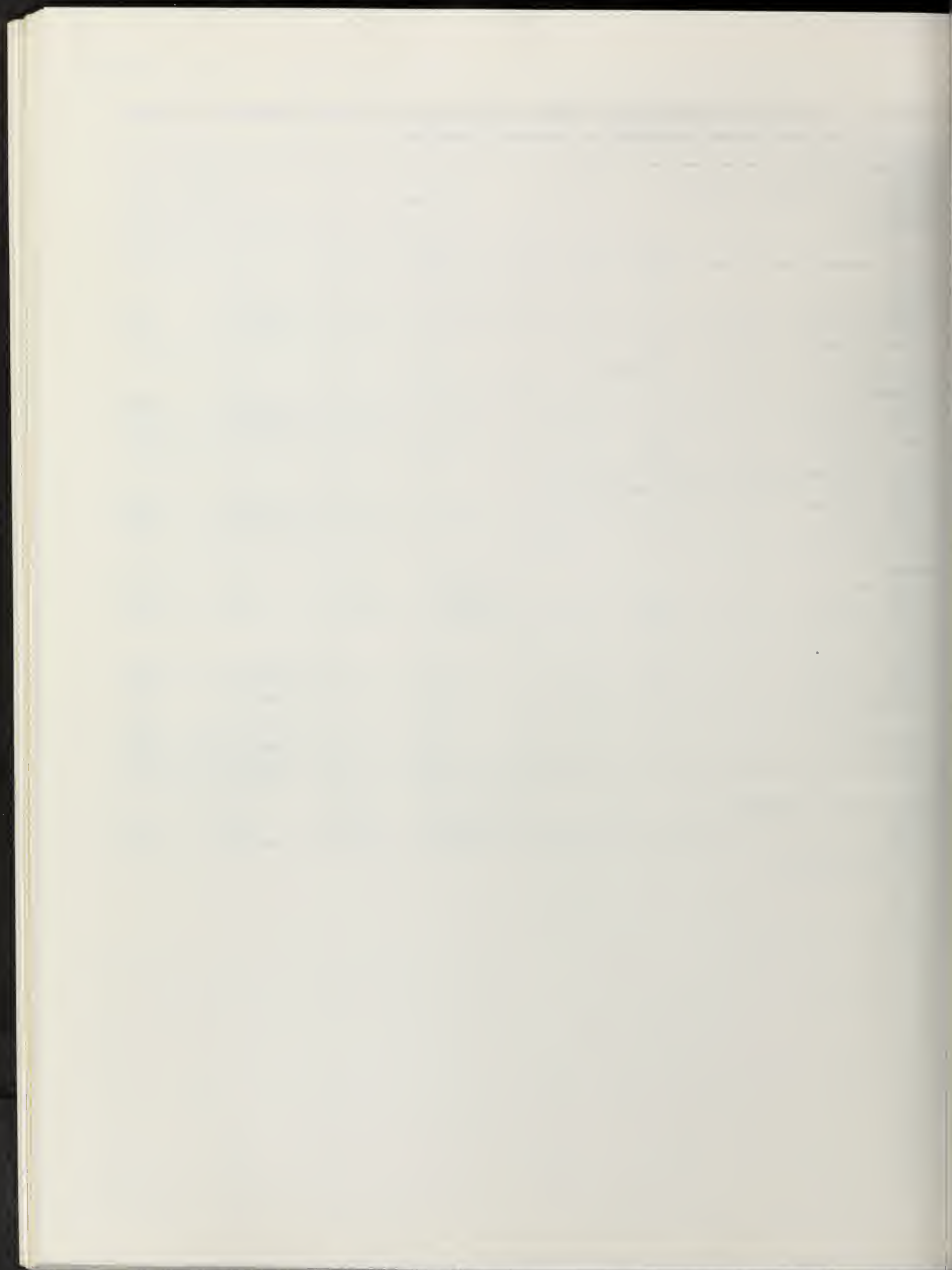
Characteristic	Persons	Families, female householders, unrelated individuals
Income:		
Total or White.....	(X)	1.1
Black.....	(X)	1.2
Spanish origin.....	(X)	1.3
Labor Force, not in labor force, employed, occupation:		
Total or White.....	(X)	1.1
Black.....	(X)	1.1
Spanish origin.....	(X)	1.0
Living arrangements, size of family, marital status, type of family, mobility, tenure status:		
Total or White.....	(X)	1.0
Black.....	(X)	1.0
Spanish origin.....	(X)	1.0
Poverty:		
Total or White.....	2.4	(X)
Black.....	2.4	(X)
Spanish origin.....	2.9	(X)
Residence:		
Total or White.....	(X)	1.2
Black.....	(X)	1.4
Spanish origin.....	(X)	1.4
Unemployed:		
Total or White.....	(X)	1.2
Black.....	(X)	1.3
Years of School Completed:		
Total or White.....	1.2	(X)
Black.....	1.4	(X)

X Not applicable.

Table B-4. "a" and "b" Parameters for CPS Data for Estimated Numbers and Percentages of Persons, Families, Female Householders, or Unrelated Individuals

Characteristic	Persons		Families, female householders, unrelated individuals	
	a	b	a	b
Income:				
Total or White.....	(X)	(X)	-0.000008	1721
Black.....	(X)	(X)	-0.000067	1876
Spanish origin.....	(X)	(X)	-0.000014	2420
Labor Force, not in labor force, employed, occupation:				
Total or White.....	(X)	(X)	-0.000019	1541
Black.....	(X)	(X)	-0.000152	1541
Spanish origin.....	(X)	(X)	-0.000018	1381
Living arrangements, size of family, marital status, type of family, mobility, tenure status:				
Total or White.....	(X)	(X)	-0.000010	1389
Black.....	(X)	(X)	-0.000087	1255
Spanish origin.....	(X)	(X)	-0.000020	1422
Poverty:				
Total or White.....	-0.000031	7946	(X)	(X)
Black.....	-0.000270	7946	(X)	(X)
Spanish origin.....	-0.000063	11528	(X)	(X)
Residence:				
Total or White.....	(X)	(X)	-0.000016	2170
Black.....	(X)	(X)	-0.000178	2561
Spanish origin.....	(X)	(X)	-0.000039	2844
Unemployed:				
Total or White.....	(X)	(X)	-0.000015	1971
Black.....	(X)	(X)	-0.000139	2265
Years of school completed:				
Total or White.....	-0.000016	2064	(X)	(X)
Black.....	-0.000186	2792	(X)	(X)

X Not applicable.



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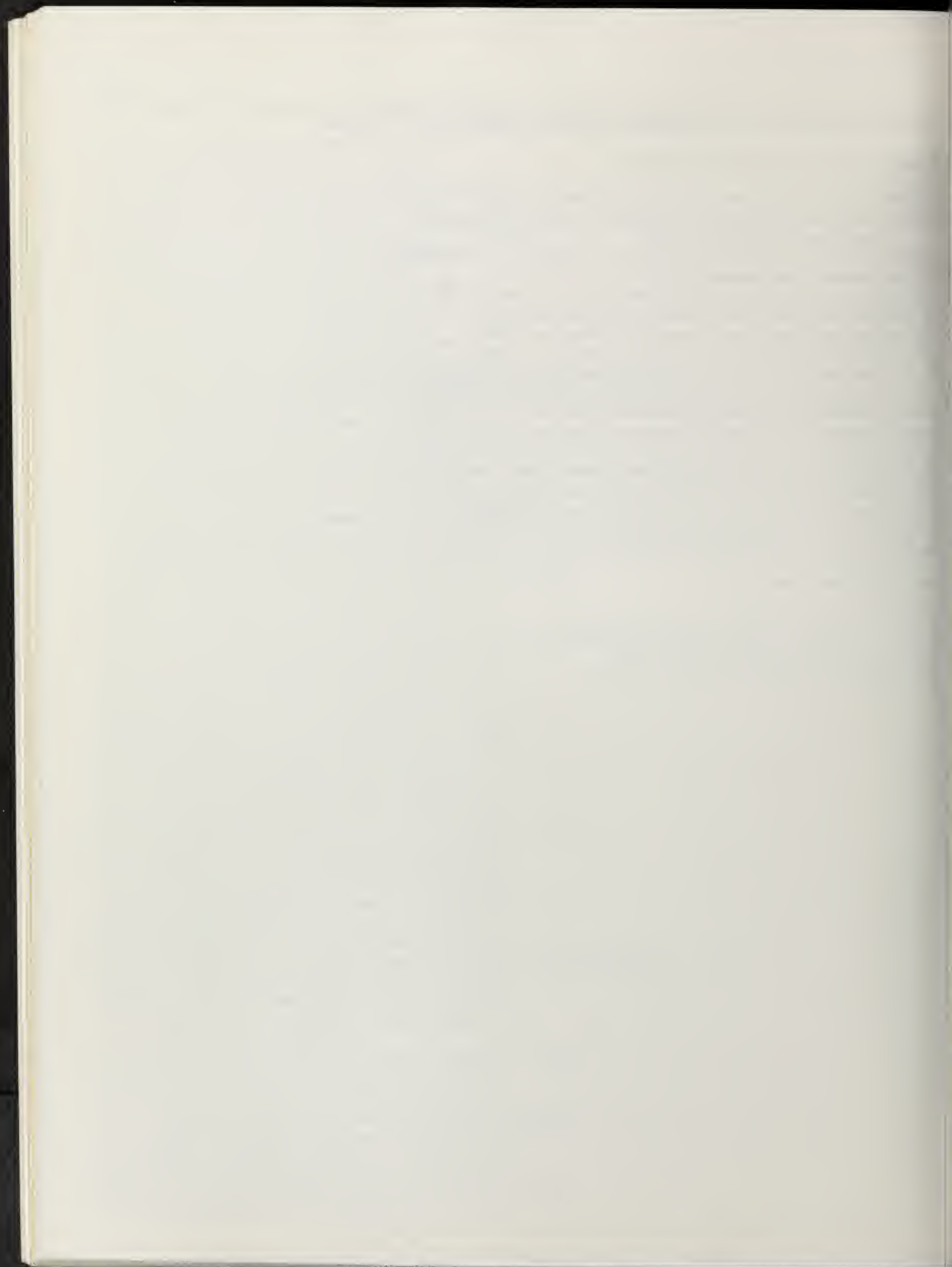
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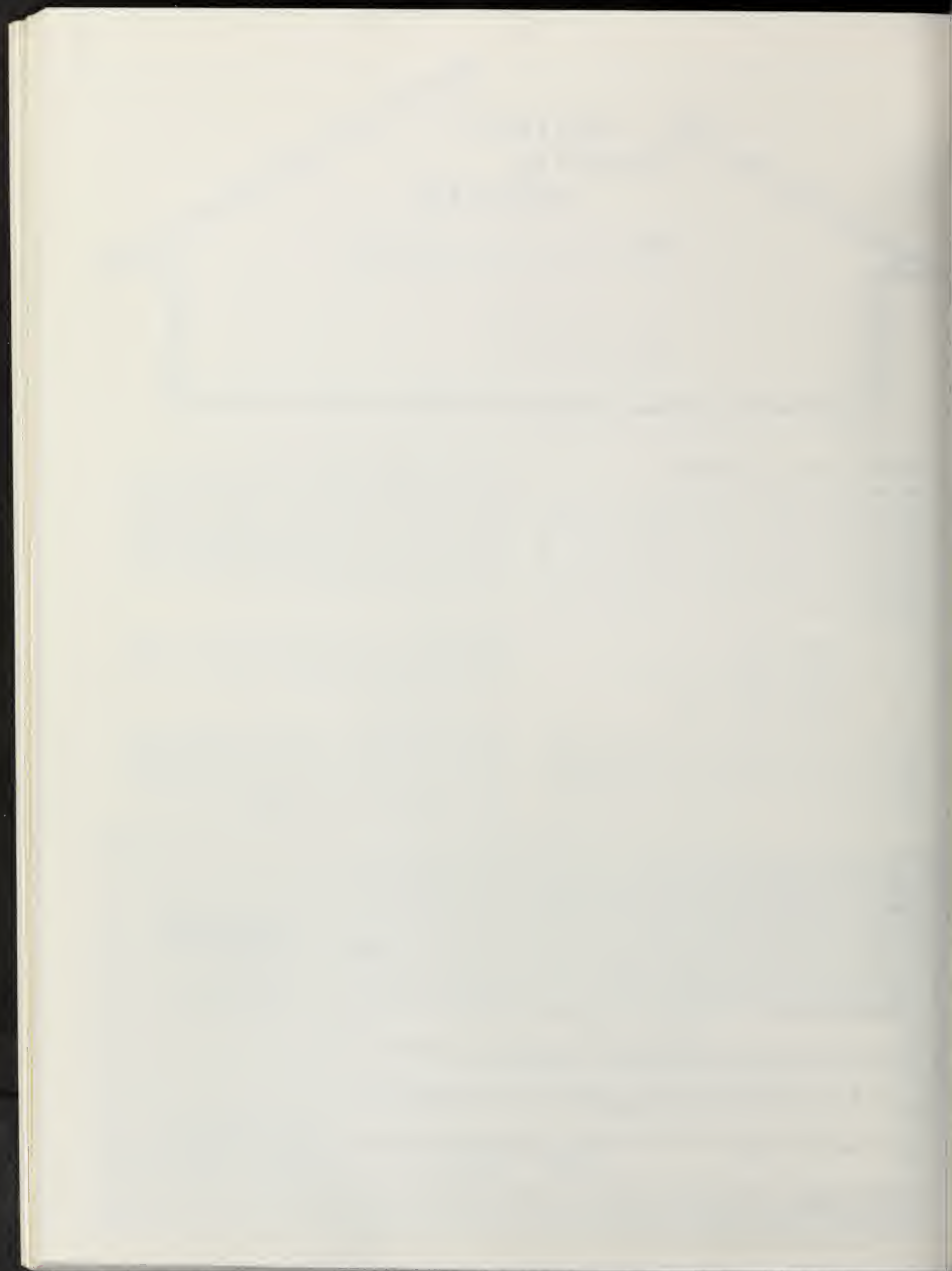
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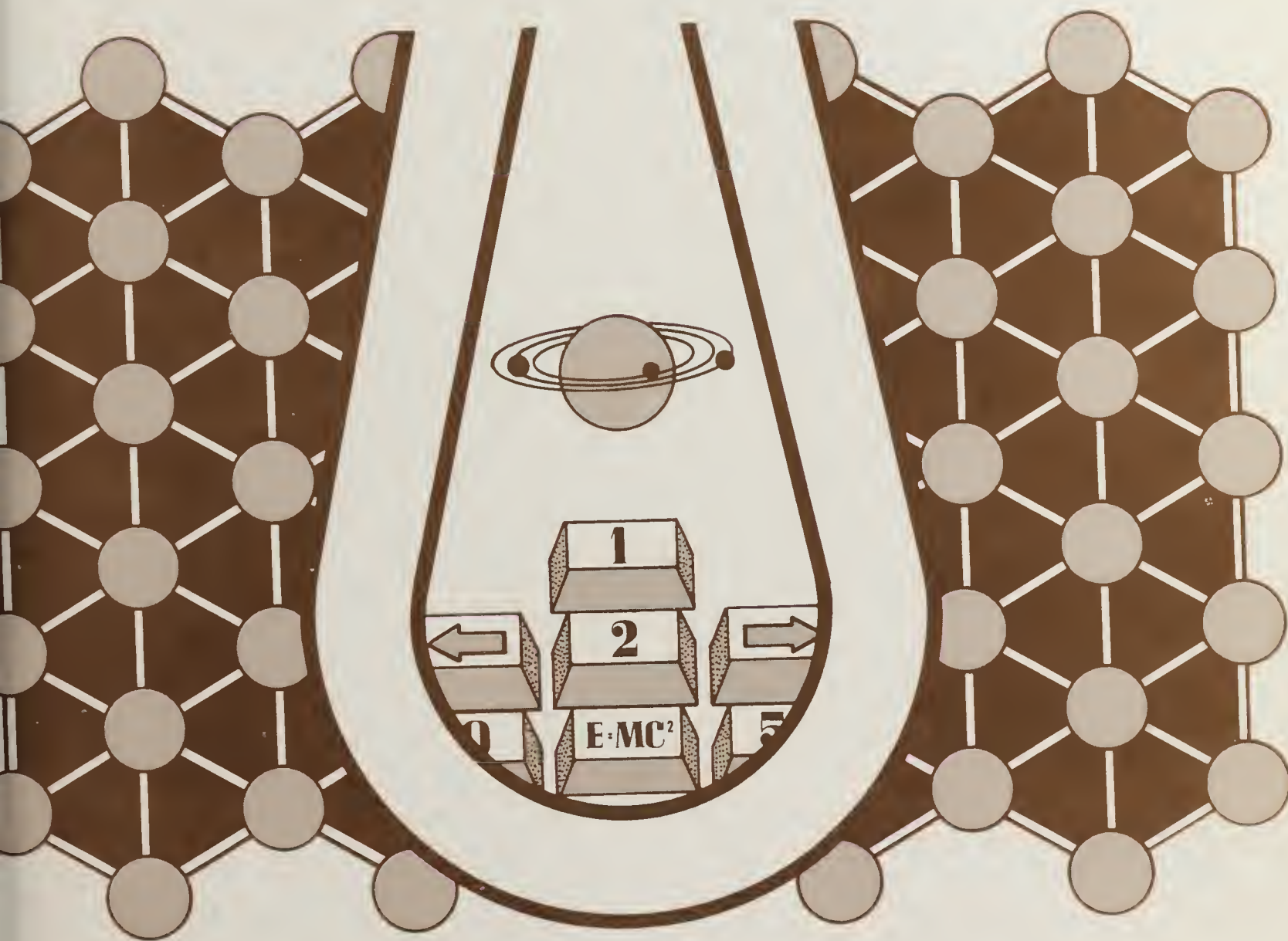


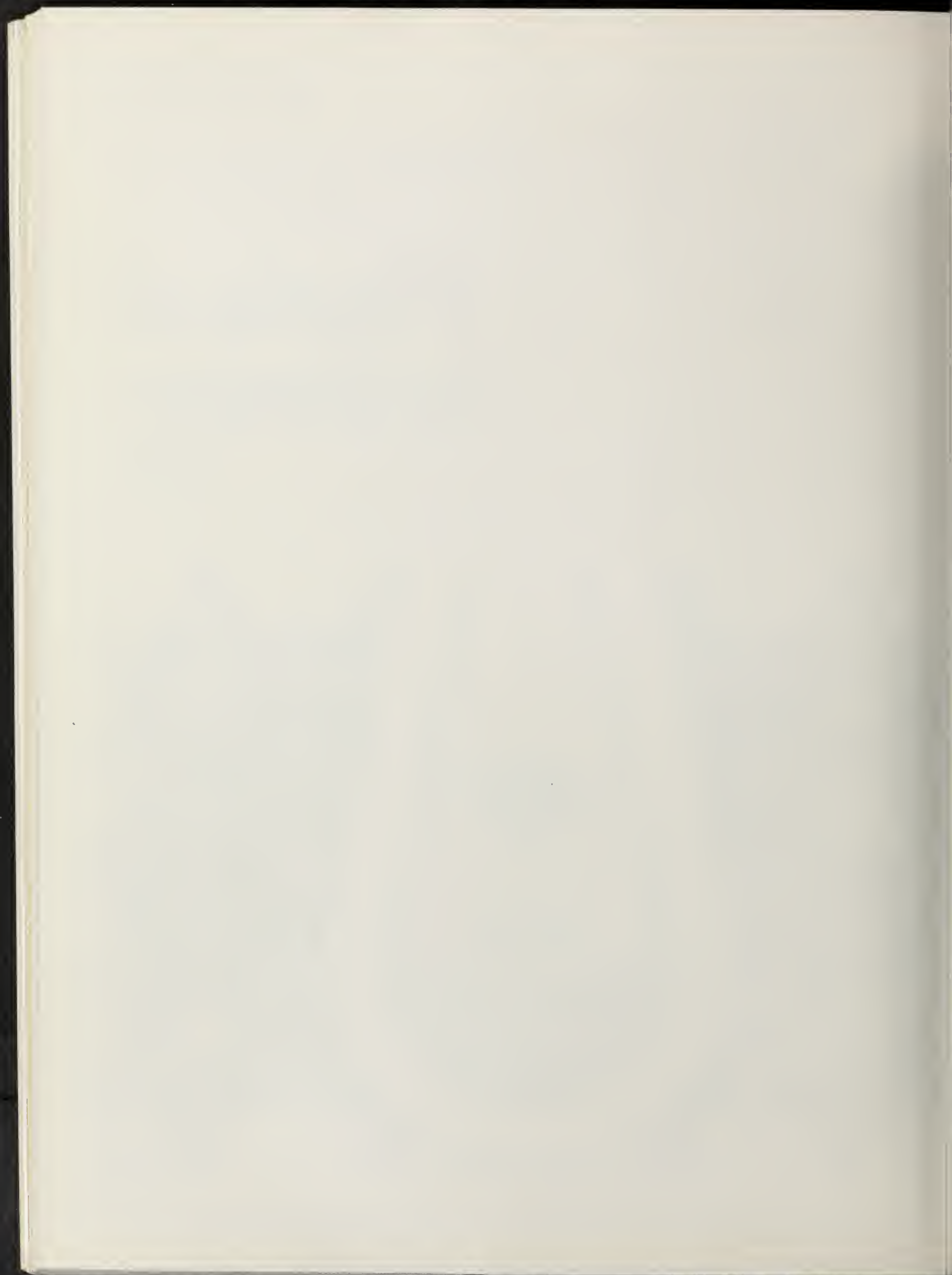
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1978

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ACKNOWLEDGMENTS

The 1978 National Survey of Natural and Social Scientists and Engineers was sponsored by the National Science Foundation, as part of the Manpower Characteristics System, and conducted by the Bureau of the Census.

The principal participants for the National Science Foundation in developing and coordinating the survey were J. James Brown, Study Director, Demographic Studies Group, and Alan Fechter, Head, Scientific and Technical Personnel Studies Section, both members of the Division of Science Resources Studies. Assistance was provided by Nancy M. Conlon, Analyst, Manpower Characteristics Studies Group.

At the Bureau of the Census, Anita Chiera, Labor Force Statistics Branch, Population Division, had primary responsibility in planning and conducting the survey. This report was prepared by Thomas J. Palumbo. The systems and processing procedures and programs were developed by Ann M. Gifford and Patricia L. Marks, of Population Division. Overall direction was provided by Roger Herriot, Division Chief (Socioeconomic Statistics Programs), and Paula J. Schneider, then Chief, Labor Force Statistics Branch, Population Division.

Library of Congress Cataloging in Publication Data

United States. Bureau of the Census.
Selected Characteristics of Persons in
Physical Science: 1978

(Current population reports : Special studies :
Series P-23 ; no. 108)

1. Scientists—United States—Statistics.
2. Engineers—United States—Statistics.
3. Demographic surveys—United States. 4. United
States—Population. I. Title. II. Series:
United States. Bureau of the Census. Current
population reports : Special studies : Series P-23 ;
no. 108.
HA203.A218 no. 108 [Q149.U5] 312'.0973s [509'.2'2]
80-607850

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SYMBOLS USED IN TABLES

—	Represents zero.
X	Not applicable.
Z	Less than 0.05 percent.
*	Based on fewer than 20 sample cases.
27+	The median fell in the category 27 weeks or more.

Related Materials

Statistics from a related survey, the 1972 Professional, Technical, and Scientific Manpower Survey, are found in: U.S. Bureau of the Census, *Characteristics of Persons in Engineering and Scientific Occupations: 1972*, Technical Paper No. 33, U.S. Government Printing Office, Washington, D.C. 1974; and U.S. Bureau of the Census, Current Population Reports, P-23, No. 45, *Persons in Engineering, Scientific, and Technical Occupations: 1970 and 1972*, U.S. Government Printing Office, Washington, D.C. 1973.

The Census Bureau report based on the results of the 1974 National Survey of Scientists and Engineers is: U.S. Bureau of the Census, Current Population Reports, Special Studies P-23, No. 53, *Selected Characteristics of Persons in Fields of Science or Engineering: 1974*, U.S. Government Printing Office, Washington, D.C. 1975. The Census Bureau report based on the 1976 survey is: U.S. Bureau of the Census, Current Population Reports, Special Studies, P-23, No. 76, *Selected Characteristics of Persons in Fields of Science or Engineering: 1976*, U.S. Government Printing Office, Washington, D.C.

For a list of the National Science Foundation reports based on the above-mentioned 1972 and 1974 surveys, see National Science Foundation, *Characteristics of the National Sample of Scientists and Engineers 1974, Part III* (NSF 76-330) Washington, D.C. 20402; and National Science Foundation, U.S. Scientists and Engineers: 1974 (NSF 76-329) Washington, D.C. 20402. Two National Science Foundation reports based on the results of the 1976 National Survey of Natural and Social Scientists and Engineers are: Science Resource Studies Highlights, *National Sample of Scientists and Engineers: Changes in Employment, 1972-1974 and 1974-1976* (NSF 77-322), Washington, D.C. 20550; and *Characteristics of Experienced Scientists and Engineers, 1976* (NSF 78-305), Washington, D.C. 20550. A National Science Foundation report containing results from the 1978 survey, along with other data from the Manpower Characteristics System, is: *U.S. Scientists and Engineers 1978* (NSF 90-304), Washington, D.C., 20550.

Selected Characteristics of Persons in Physical Science: 1978

INTRODUCTION

The statistics in this report are based on the 1978 survey in a series of biennial surveys known as the National Sample of Scientists and Engineers. The series was sponsored by the National Science Foundation and conducted by the Bureau of the Census. The series began with the 1972 Professional, Technical, and Scientific Manpower Survey, with followup surveys of persons from the 1972 survey conducted in 1974, 1976, and 1978. All persons in the National Sample were experienced workers who either had jobs in 1970 or were looking for jobs; new entrants into the labor force since 1970 were *not* included. In addition, the fields of science and engineering in the National Sample were limited to persons who met strict educational, occupational, and professional qualifications. For these reasons, persons in the 1978 National Sample represented approximately 1.5 million scientists and engineers, only a part of the Nation's total scientific and engineering work force. (The Department of Labor estimated that, based on occupational qualifications alone, there were 2.4 million scientists and engineers in the United States in 1978.)¹

This report is the first in a series of reports on the characteristics of persons in the 1978 National Sample. Profiled here are persons in the field of physical science: chemists, physicists and astronomers, and other physical scientists.

COMPOSITION (Table 1)

The physical scientists in the National Sample were predominantly males. Men, in fact, made up slightly more than 9 out of 10 physical scientists (92 percent), a proportion that rose to 97 percent for the subcategory of physicists/astronomers. Women made their strongest showing among chemists, constituting 10 percent of that group.

The median age in 1978 of the physical scientists in the National Sample was 45 years.

The geographic distribution of physical scientists throughout the United States was oriented more toward the Northeast and less toward the South and North Central Regions than was the general population of the United States 25 years old and over. About 30 percent of physical scientists resided in the Northeast (New England and the Middle Atlantic States), 24 percent in the North Central Region, 26 percent in the South (South Atlantic, East and West South Central States), and 19 percent in the West (Mountain and Pacific States). Estimates from the Current Population Survey (CPS) indicate that in March 1978, 24 percent of the

¹ U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 26, No. 1, January 1979.

total U.S. population 25 years old and over lived in the Northeast, 26 percent in the North Central Region, 32 percent in the South, and 18 percent in the West (figure 1).²

Most members of this group of physical scientists were White (93 percent). Asian-Americans constituted 4 percent, and Blacks, 2 percent. Only about 1 percent indicated that their ethnic heritage was Hispanic.

The fields of science or engineering (S/E) in the National Sample were much more strictly defined categories than occupations. In general, to be classified into a specific field, a person had to have at least two of the following three characteristics: (1) employment in one of a set of specified occupations, (2) an academic degree among a set of specified academic disciplines, and (3) self-identification within a set of specified professions. Because of this criterion, persons in each field were distributed among a spectrum of occupations.

Not surprisingly, the majority of persons in the physical science field, about 70 percent, were in physical science occupations. Nearly one-fifth (18 percent), however, were managers and administrators, a finding that is possibly related to the fact that persons in the field of physical science are generally mature workers (median age 45 years) with many years of professional experience (a median of 19 years). The only other sizeable group of physical scientists was in the interdisciplinary occupation of biochemistry (7 percent).

EDUCATION AND TRAINING (Table 2)

Roughly one-half (49 percent) of the physical scientists possessed doctorate degrees; one-third held their highest degree of the bachelor's level, and about one-sixth (17 percent) held theirs at the master's level. About two-thirds of the physicists/astronomers held doctorates. (See figure 2.)

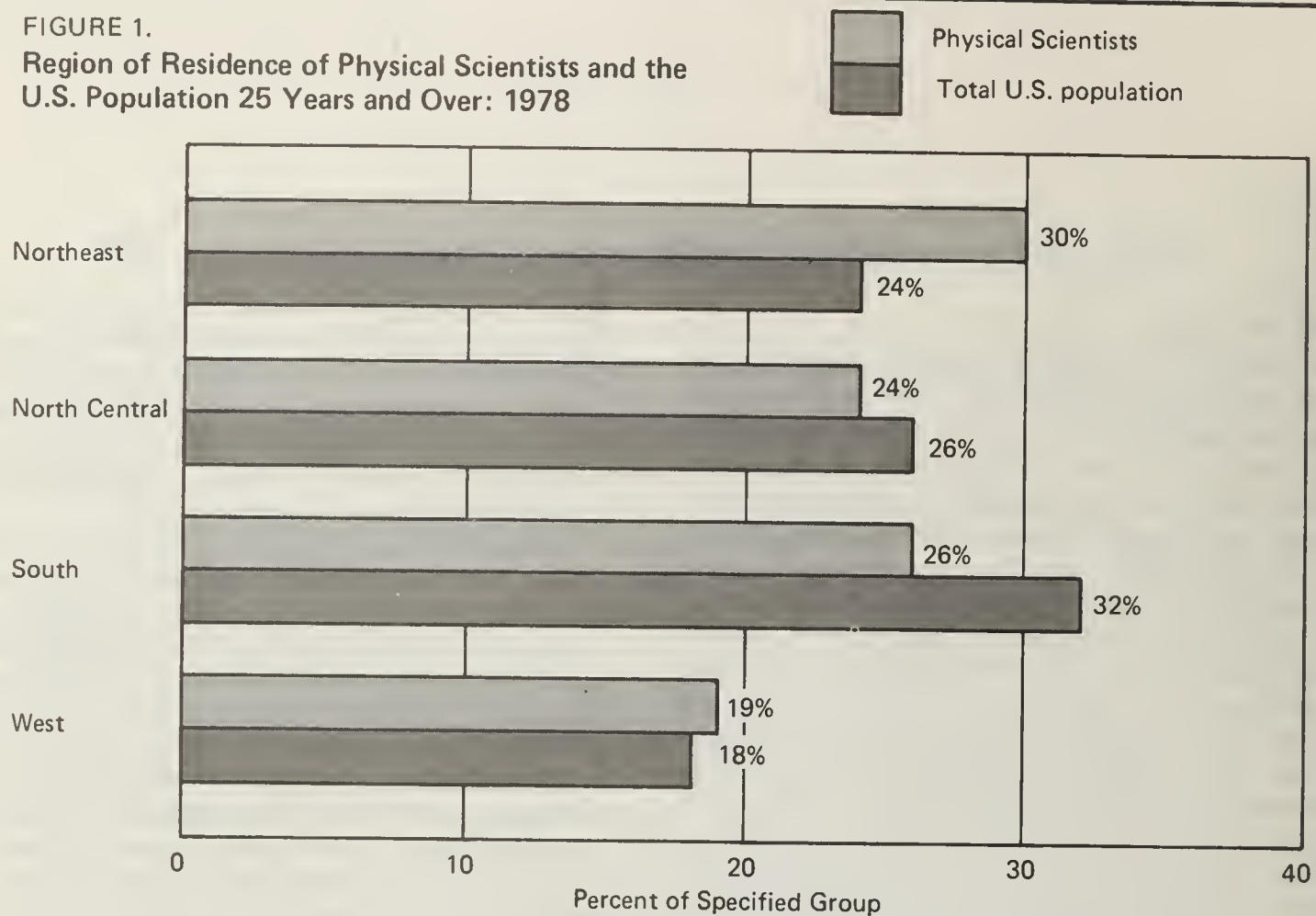
About 92 percent of the physical scientists held their highest degree in a physical or biological science.

Since the median age of the physical scientists was 45 years, many members of this group received their academic degrees 20 or more years ago. To maintain or upgrade their academic skills, many physical scientists (39 percent) turned to supplemental training programs in 1977. Notable proportions of the physical scientists who received supplemental training in 1977 received it from their employers as on-the-job training (49 percent of those receiving training) or in employer training programs (37 percent of those receiving training).³ (See figure 3).

² Current Population Reports, Series P-20, No. 331, *Geographical Mobility: March 1975 to March 1978*.

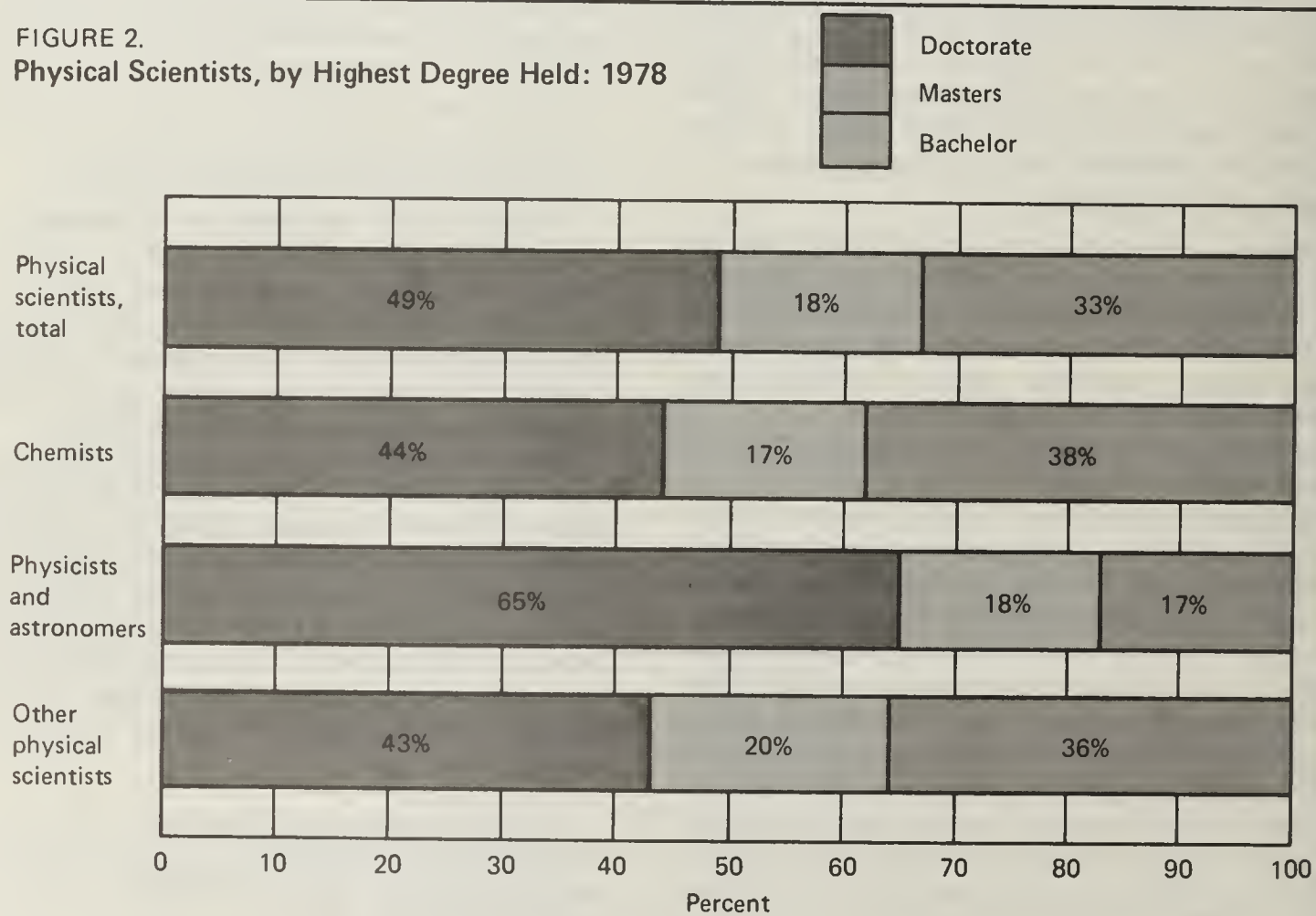
³ Note that the categories of supplemental training are not mutually exclusive: the same person may have more than one kind of supplemental training.

FIGURE 1.
Region of Residence of Physical Scientists and the
U.S. Population 25 Years and Over: 1978



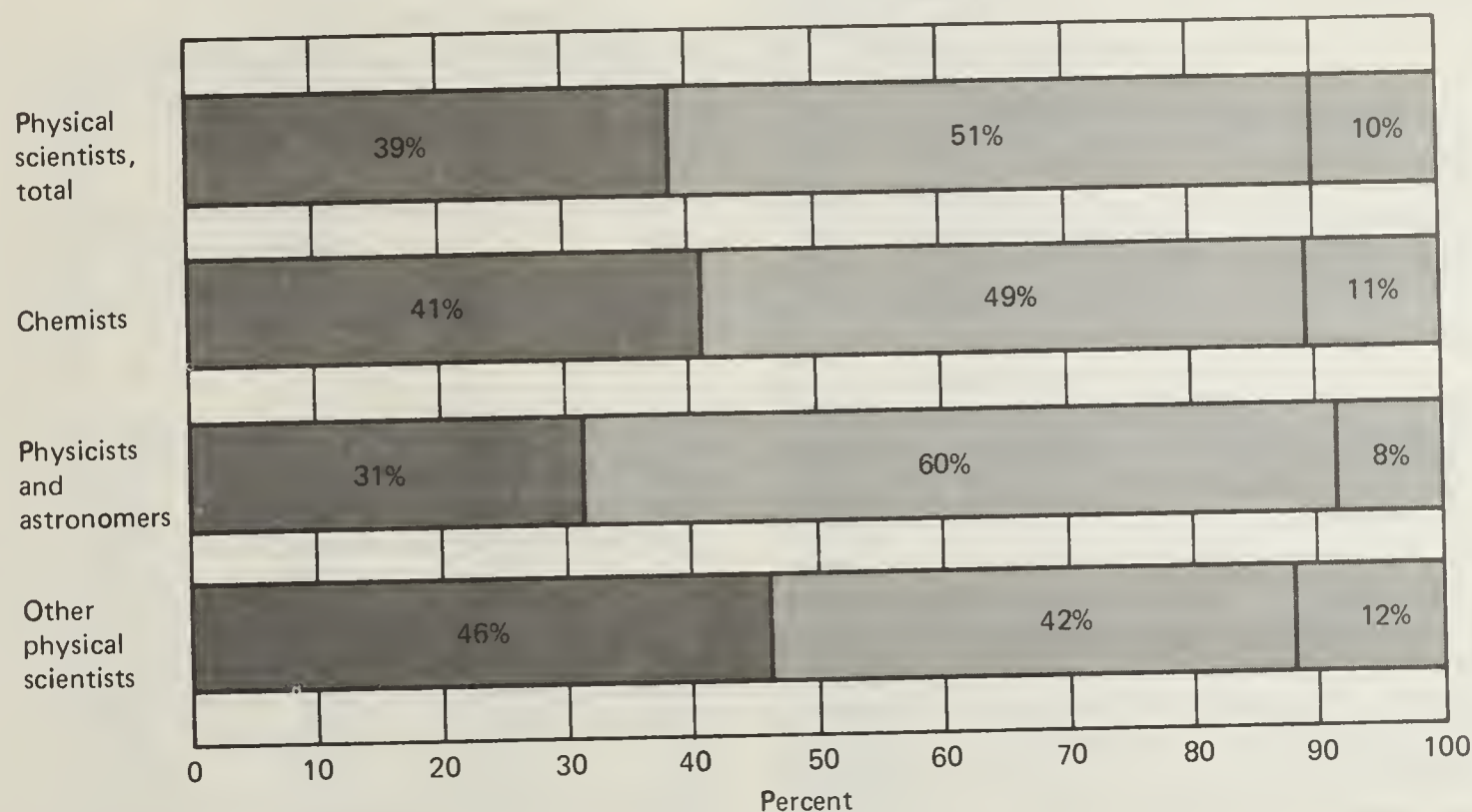
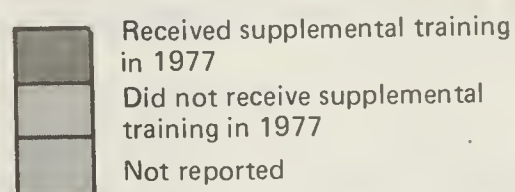
Source: Table 1 and Current Population Reports, Series P-20, No. 331, *Geographical Mobility: March 1975 to March 1978*.

FIGURE 2.
Physical Scientists, by Highest Degree Held: 1978



Source: Table 2.

FIGURE 3.
Physical Scientists in 1978, by Supplemental Training Received in 1977



Source: Table 2.

PROFESSIONAL EXPERIENCE AND GROWTH OF THE FIELD (Table 3)

Most of these physical scientists have been involved in professional-level work, though not necessarily in the physical sciences, for a number of years. The median number of years of professional experience for the group was 19 years. About 94 percent had more than 5 years of professional experience, 79 percent had over 10 years, and a little over 40 percent had more than 20 years.

Column 3 of the upper percent distribution of table A shows how the stock of physical scientists in 1978 was created from the flow of persons from each component of the 1976 National Sample of Scientists and Engineers. These figures reveal that about 88 percent of the physical scientists in 1978 were also physical scientists in 1976; about 6 percent of the 1978 group entered from other S/E fields in 1976, notably engineering (3 percent), while the remainder came from outside S/E or from among persons who did not report their S/E status in 1976. The lower percent distribution in table A shows the flow of persons from the components of the 1976 National Sample into the components of the 1978 National Sample. Both percent distributions of table A reveal a noteworthy movement of persons between engineering and the physical sciences, which may be related to the involvement of engineering in practical applications of physical science.

About one-fourth of the physical scientists employed in both February 1978 and February 1976 changed jobs⁴ during the 2-year period; among these job changers, about one-third changed their detailed occupation at the time that they changed jobs. Of those employed in both February 1978 and January 1974, nearly two-fifths (38 percent) changed jobs during the 4-year period; of these, about two-fifths (39 percent) changed detailed occupations as well. Finally, of those employed in February 1978 and 1972, one-half (49 percent) had a different job at the end of the 6-year period than at the beginning; of these, 40 percent changed detailed occupations.⁵ Thus, job changers increased from one-fourth of the physical scientists in 2 years, to two-fifths in 4 years, to one-half in 6 years. (See figure 4).

LABOR FORCE PARTICIPATION (Table 4)

In February 1978, 93 percent of the physical scientists were in the labor force. Of those not in the labor force, 82 percent were retired.

The unemployment rate (that is, the number unemployed as a percent of those in the labor force) for physical scientists

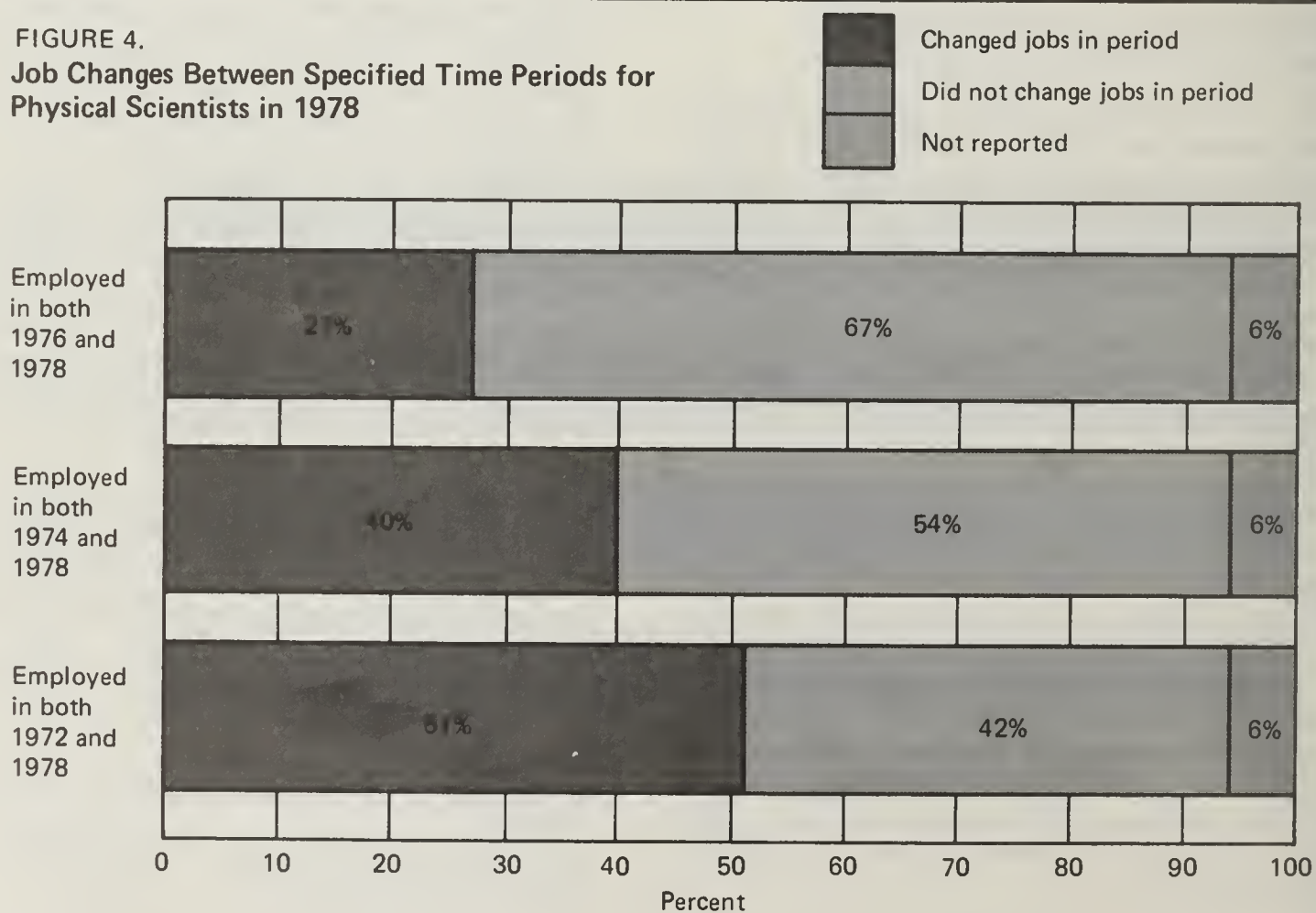
⁴ That is, changed employers or remained with the same employer, but had a significant change in their duties, level of responsibility, or occupation.

⁵ The difference between this 40 percent and the above-mentioned 39 percent of persons who changed occupations between 1974 and 1978 is not statistically significant.

Table A. Field of Science or Engineering in 1978 by Field of Science or Engineering in 1976

(Numbers in thousands)

Field of science or engineering in 1976	Total National Sample in 1978	In field of science or engineering in 1978				Not in S/E field in 1978
		Total	Physical scientists	Other S/E field		
				Total	Engineering	
Total National Sample in 1976...	1,350	1,138	130	1,008	721	211
In S/E field in 1976.....	1,119	1,029	122	908	660	90
Physical scientists.....	130	122	114	9	4	8
Other S/E field.....	989	906	8	899	655	82
Engineering.....	707	660	4	656	649	47
Not in S/E field in 1976.....	173	64	4	60	32	109
Did not report in 1976.....	57	45	4	41	30	12
PERCENT DISTRIBUTION						
Total National Sample in 1976...	100.0	100.0	100.0	100.0	100.0	100.0
In S/E field in 1976.....	82.9	90.4	93.6	90.0	91.5	42.5
Physical scientists.....	9.7	10.8	87.6	0.8	0.6	3.8
Other S/E field.....	73.3	79.6	6.0	89.2	90.9	38.7
Engineering.....	52.4	58.0	3.3	65.0	90.0	22.3
Not in S/E field in 1976.....	12.8	5.6	3.3	5.9	4.4	51.7
Did not report in 1976.....	4.2	4.0	3.1	4.1	4.1	5.8
Total National Sample in 1976...	100.0	84.3	9.6	74.7	53.4	15.7
In S/E field in 1976.....	100.0	92.0	10.9	81.1	58.9	8.0
Physical scientists.....	100.0	93.8	87.3	6.6	3.3	6.2
Other S/E field.....	100.0	91.7	0.8	90.9	66.3	8.3
Engineering.....	100.0	93.3	0.6	92.7	91.8	6.7
Not in S/E field in 1976.....	100.0	36.9	2.5	34.4	18.5	63.1
Did not report in 1976.....	100.0	78.6	7.0	71.6	51.6	21.4

FIGURE 4.**Job Changes Between Specified Time Periods for Physical Scientists in 1978**

Source: Table 3

was a very low 1.1 percent in February 1978. The national unemployment rate (seasonally adjusted) for persons 25 years and over in February 1978 was 3.9 percent, that for males 25 years and over was 3.4 percent, and that for professional, technical, and kindred workers was 2.5 percent⁶ (table B).

About 3 percent of the physical scientists were unemployed at some time in calendar year 1977. Unemployed physical scientists spent a median of 15 weeks jobseeking; about one-third of the unemployed searched for 27 weeks or more.

Nearly all of the employed physical scientists (97 percent) worked at full-time jobs. (See table C.)

Most of the physical scientists who worked at part-time jobs apparently did so voluntarily, since about 80 percent indicated that they were not seeking full-time jobs. (See table D.)

The finding that a relatively small number of the employed physical scientists were seeking full-time jobs while they worked at part-time jobs seems to indicate that underemployment is not much of a problem among the National Sample's physical scientists. Furthermore, fewer than 1 percent of the physical scientists employed full-time indicated that they were working in non-scientific or non-engineering positions either because scientific or engineering positions were not available or because the pay was better in other

positions. Around 98 percent of the full-time employed physical scientists were working in scientific or engineering positions.

Large proportions of employed physical scientists were in particular industry groups in February 1978: manufacturing (43 percent), especially of chemicals and allied products (25 percent); educational institutions (24 percent), particularly colleges and universities (20 percent); and research institutions (15 percent). A notable 4 percent of the physical scientists were employed in manufacturing electronic machinery and other computing equipment; 5 percent were in public administration.

The 1978 National Sample survey asked persons to describe the type of organization of their principal employment or post-doctoral appointment. Among physical scientists employed in February 1978, 55 percent specified their employer's organization as a (private) business or industry, 25 percent as an educational institution. Around 14 percent were employed in government, of which three-fourths (72.2 percent) were employed by the Federal Government.

Research and development (R/D) or management and administration were the primary work activities of the largest proportion of employed physical scientists (68 percent). About 42 percent were primarily involved in R/D itself, and another 17 percent were primarily involved in the management or administration of R/D. About 10 percent were primarily involved in other kinds of management or administration.

⁶ U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 25, No. 3, March 1978

Table B. Employment Status in February 1978 of Physical Scientists in 1978

Employment status	Total		Chemists		Physicists and astronomers		Other physical scientists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total in labor force in February 1978.....	120,220	100.0	83,860	100.0	30,318	100.0	6,041	100.0
Employed.....	118,936	98.9	82,773	98.7	30,135	99.4	6,028	99.8
Unemployed.....	1,283	1.1	1,087	1.3	183	0.6	13	0.2

Source: Table 4.

Table C. Full- and Part-Time Work Status of Physical Scientists in 1978 Employed in February 1978

Full/part-time work status	Total		Chemists		Physicists and astronomers		Other physical scientists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total employed in February 1978.....	118,936	100.0	82,773	100.0	30,135	100.0	6,028	100.0
Full time.....	115,132	96.8	79,964	96.6	29,424	97.6	5,744	95.3
Part time.....	3,755	3.2	2,773	3.4	699	2.3	284	4.7
Full or part time not reported.	49	(Z)	37	(Z)	12	(Z)	-	-

Z Less than 0.05 percent.

- Represents zero.

Source: Table 4.

Table D. Desire for Full-Time Work of Physical Scientists in 1978 Employed Part Time in February 1978

Desire for full-time work	Total		Chemists		Physicists and astronomers		Other physical scientists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total employed part time in February 1978.....	3,755	100.0	2,773	100.0	699	100.0	284	100.0
Seeking full-time work.....	771	20.5	547	19.7	204	29.2	20	7.0
Not seeking full-time work.....	2,969	79.1	2,210	79.7	496	67.1	264	93.0
Not reported.....	15	0.4	15	0.5	-	-	-	-

- Represents zero.

Source: Table 4.

Among physical scientists directly involved in research and development, 30 percent were in basic research, 39 percent in applied research, and 30 percent in development.

Persons in the National Sample were asked to select, from a list of areas of critical national interest, the problem areas in which they devote the largest proportion of their professional time. For physical scientists, 13 percent selected health; 13 percent, education (mostly teaching); 13 percent, environmental protection and pollution abatement; 10 percent, national defense; 11 percent, energy and fuel, and one-fifth indicated that the inquiry was not applicable to them.

The U.S. Government supported or sponsored at least some of the work of 40 percent of the physical scientists. Chief Government sponsors were the Department of Defense (which provided funds for 12 percent of the physical scientists), the Energy Department (which funded 10 percent), the Department of Health, Education, and Welfare (which funded 8 percent), and the National Science Foundation (which funded 6 percent).

INCOME (Table 5)

The median basic annual salary in February 1978 of the physical scientists employed full-time in February 1978 was \$27,329. The median for chemists was \$26,525; that for physicists/astronomers was \$29,052, and that for other physical scientists was \$28,390.⁷ The median earnings in 1977, as estimated from the CPS,⁸ for male professional,

⁷The apparent differences between the median earnings of chemists and physicists/astronomers and that of physical scientists, total, are not statistically significant.

⁸U.S. Department of Commerce, Bureau of the Census, Current Population Reports, *Money Income in 1977 of Families and Persons in the United States*, Series P-60, No. 118.

technical, and kindred workers 14 years old and over working year round full time was \$18,224; the comparable figure for women was \$11,995. Male year-round, full-time workers 25 years old and over with 4 or more years of college (regardless of occupation) had a median income in 1977 of \$20,625; those with 5 or more years of college had a median income of \$27,941. It should be noted that the CPS figures are not strictly comparable with those for the physical scientists in the National Sample.⁹

Results from the 1976 survey of the National Sample showed that the median basic annual salary in February 1976 of physical scientists employed full time in February 1976 was \$23,132. Thus, between February 1976 and February 1978, the median basic annual salary of full-time physical scientists rose by \$4,197 to \$27,329. However, when these figures are adjusted for inflation (i.e., when both the 1976 and 1978 basic annual salaries are expressed in constant 1977 dollars), the increase is approximately \$1,284 or about 2.4 percent per year. Note that the 1976-78 comparisons in terms of constant or 1977 dollars must be approached cautiously. Problems are introduced into the comparisons by, among other things, the way the basic annual salary data are defined and collected, the differences between the nonresponse adjustment procedures of the 1976 and 1978 surveys, and the difficulty of establishing appropriate time periods for the constant dollar computations.

⁹The CPS concepts "earnings" and "income" include more sources of financial support than does the National Sample concept of "basic annual salary"; there are also other differences between the National Sample's basic annual salary concept and the CPS earnings and income concepts, as well as differences between the National Sample and the CPS in reference periods and data collection procedures. CPS figures for 1977 are cited because 1977 is the full year most nearly comparable with the reference year for the National Sample question on basic annual salary.

Table 1. Occupation, Professional Identification, and Selected Characteristics of Physical Scientists: 1978

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Occupation, professional identification, and selected characteristics	Physical scientists, total		Chemists		Physicists and astronomers		Other physical scientists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
Male.....	119,651	92.1	82,886	90.1	30,798	97.4	5,967	94.8
Female.....	10,267	7.9	9,115	9.9	825	2.6	327	5.2
Under 30 years.....	880	0.7	646	0.7	233	0.7	-	-
30 to 34 years.....	15,734	12.1	10,977	11.9	4,235	13.4	521	8.3
35 to 39 years.....	26,225	20.2	17,006	18.5	7,736	24.5	1,483	23.6
40 to 44 years.....	22,122	17.0	14,992	16.3	5,893	18.6	1,236	19.6
45 to 49 years.....	19,404	14.9	13,253	14.4	5,255	16.6	896	14.2
50 to 54 years.....	16,164	12.4	11,723	12.7	3,400	10.8	1,041	16.5
55 to 59 years.....	13,062	10.1	10,526	11.4	2,064	6.5	471	7.5
60 to 64 years.....	8,584	6.6	6,657	7.2	1,535	4.9	392	6.2
65 to 69 years.....	5,244	4.0	4,387	4.8	674	2.1	183	2.9
70 years and over.....	2,501	1.9	1,834	2.0	596	1.9	71	1.1
Median age.....	45	(X)	46	(X)	43	(X)	45	(X)
RESIDENCE IN 1978								
Total.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
United States.....	128,601	99.0	91,208	99.1	31,112	98.4	6,281	99.8
Northeast.....	39,238	30.2	29,091	31.6	8,702	27.5	1,445	23.0
New England.....	9,557	7.4	6,225	6.8	2,966	9.4	365	5.8
Middle Atlantic.....	29,682	22.8	22,866	24.9	5,736	18.1	1,080	17.2
North Central.....	31,156	24.0	24,719	26.9	5,220	16.5	1,216	19.3
East North Central.....	23,925	18.4	18,926	20.6	4,120	13.0	879	14.0
West North Central.....	7,231	5.6	5,793	6.3	1,100	3.5	338	5.4
South.....	33,847	26.1	23,820	25.9	7,891	25.0	2,137	34.0
South Atlantic.....	20,316	15.6	13,803	15.0	4,838	15.3	1,675	26.6
East South Central.....	4,534	3.5	3,139	3.4	1,149	3.6	245	3.9
West South Central.....	8,998	6.9	6,877	7.5	1,903	6.0	217	3.4
West.....	24,359	18.7	13,578	14.8	9,299	29.4	1,482	23.5
Mountain.....	6,151	4.7	3,227	3.5	2,281	7.2	642	10.2
Pacific.....	18,209	14.0	10,351	11.3	7,018	22.2	840	13.4
Outlying areas.....	32	(Z)	-	-	32	0.1	-	-
Foreign countries.....	1,284	1.0	792	0.9	479	1.5	13	0.2
Not reported.....	-	-	-	-	-	-	-	-
RACE								
Total.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
White.....	121,346	93.4	85,467	92.9	29,894	94.5	5,985	95.1
Black.....	2,262	1.7	2,156	2.3	105	0.3	-	-
American Indian.....	192	0.1	192	0.2	-	-	-	-
Chinese, Japanese, Korean.....	5,279	4.1	3,408	3.7	1,589	5.0	281	4.5
All other races.....	839	0.6	777	0.8	34	0.1	28	0.5
HISPANIC HERITAGE								
Total.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
Hispanic.....	1,468	1.1	1,163	1.3	305	1.0	-	-
Not Hispanic.....	123,720	95.2	87,523	95.1	30,060	95.1	6,137	97.5
Not reported.....	4,730	3.6	3,315	3.6	1,258	4.0	157	2.5
OCCUPATION IN 1978								
Total employed in February 1978.....	118,936	100.0	82,773	100.0	30,135	100.0	6,028	100.0
Computer specialists, total.....	450	0.4	70	(Z)	380	1.3	-	-
Computer systems analysts.....	118	(Z)	29	(Z)	89	0.3	-	-
Computer scientists.....	120	0.1	-	-	120	0.4	-	-
Computer programmers.....	72	(Z)	-	-	72	0.2	-	-
Other computer fields.....	140	0.1	41	(Z)	99	0.3	-	-
Engineers, total.....	1,971	1.7	817	1.0	1,154	3.8	-	-
Aeronautical and astronautical.....	32	(Z)	-	-	32	0.1	-	-
Agricultural.....	-	-	-	-	-	-	-	-
Chemical.....	308	0.3	283	0.3	25	(Z)	-	-
Civil and architectural.....	-	-	-	-	-	-	-	-
Electrical and electronic.....	664	0.6	60	(Z)	603	2.0	-	-
Industrial.....	113	(Z)	25	(Z)	89	0.3	-	-
Mechanical.....	30	(Z)	-	-	30	(Z)	-	-
Metallurgical and materials.....	154	0.1	154	0.2	-	-	-	-
Mining, petroleum, and geological.....	58	(Z)	43	(Z)	16	(Z)	-	-
Nuclear.....	90	(Z)	-	-	90	0.3	-	-
Environmental and sanitary.....	92	(Z)	92	0.1	-	-	-	-
Operations research/systems.....	115	(Z)	44	(Z)	72	0.2	-	-
Other engineering fields.....	314	0.3	117	0.1	198	0.7	-	-

Table 1. Occupation, Professional Identification, and Selected Characteristics of Physical Scientists: 1978—Continued

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Occupation, professional identification, and selected characteristics	Physical scientists, total		Chemists		Physicists and astronomers		Other physical scientists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
OCCUPATION IN 1978--Continued								
Mathematicians and statisticians, total....	202	0.2	86	0.1	117	0.4	-	-
Mathematicians.....	63	(Z)	-	-	63	0.2	-	-
Statisticians.....	54	(Z)	54	(Z)	-	-	-	-
Actuaries.....	20	(Z)	-	-	20	(Z)	-	-
Operations research.....	66	(Z)	32	(Z)	34	0.1	-	-
Life scientists.....	9,500	8.0	9,438	11.4	62	0.2	-	-
Agricultural scientists.....	189	0.2	176	0.2	13	(Z)	-	-
Biological scientists.....	343	0.3	330	0.4	13	(Z)	-	-
Biochemists.....	8,400	7.1	8,400	10.1	-	-	-	-
Biophysicists.....	124	0.1	108	0.1	16	(Z)	-	-
Medical scientists.....	376	0.3	356	0.4	20	(Z)	-	-
Other life scientists.....	67	(Z)	67	(Z)	-	-	-	-
Physical scientists, total.....	82,289	69.2	54,933	66.4	21,998	73.0	5,357	88.9
Chemists.....	54,626	45.9	54,626	66.0	-	-	-	-
Physicists and astronomers.....	21,788	18.3	12	(Z)	21,761	72.2	16	0.3
Other physical scientists.....	5,874	4.9	295	0.4	238	0.8	5,342	88.6
Environmental scientists, total.....	447	0.4	233	0.3	213	0.7	-	-
Earth scientists.....	306	0.3	179	0.2	127	0.4	-	-
Atmospheric scientists.....	68	(Z)	26	(Z)	43	0.1	-	-
Oceanographers.....	73	(Z)	29	(Z)	44	0.1	-	-
Psychologists.....	13	(Z)	-	-	-	-	13	0.2
Social scientists, total.....	-	-	-	-	-	-	-	-
Economists.....	-	-	-	-	-	-	-	-
Sociologists and anthropologists.....	-	-	-	-	-	-	-	-
Other social scientists.....	-	-	-	-	-	-	-	-
Health occupations.....	188	0.2	174	0.2	13	(Z)	-	-
Physician or surgeon.....	-	-	-	-	-	-	-	-
Dental technician.....	-	-	-	-	-	-	-	-
Medical technician.....	103	(Z)	103	0.1	-	-	-	-
Other health occupations.....	85	(Z)	71	(Z)	13	(Z)	-	-
Technicians and technologists, except medical.....	45	(Z)	29	(Z)	15	(Z)	-	-
Teachers ¹	796	0.7	498	0.6	174	0.6	124	2.1
Administrators and managers.....	21,794	18.3	15,385	18.6	5,876	19.5	533	8.8
Other occupations.....	1,083	0.9	984	1.2	99	0.3	-	-
Not reported.....	159	0.1	124	0.2	35	0.1	-	-
PROFESSIONAL IDENTIFICATION IN 1978								
Total.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
Computer specialists.....	250	0.2	-	-	228	0.7	22	0.3
Engineers.....	2,199	1.7	862	0.9	1,290	4.1	46	0.7
Mathematicians and statisticians.....	96	(Z)	96	0.1	-	-	-	-
Life scientists.....	11,122	8.6	11,077	12.0	31	(Z)	13	0.2
Physical scientists.....	97,116	74.8	65,639	71.3	25,846	81.7	5,631	89.5
Environmental scientists.....	192	0.1	73	(Z)	105	0.3	13	0.2
Psychologists.....	-	-	-	-	-	-	-	-
Social scientists.....	19	(Z)	-	-	19	(Z)	-	-
Health occupations.....	125	(Z)	110	0.1	16	(Z)	-	-
Technicians, except medical.....	211	0.2	179	0.2	32	0.1	-	-
Teachers.....	300	0.2	180	0.2	82	0.3	37	0.6
Administrators.....	16,003	12.3	11,874	12.9	3,655	11.6	474	7.5
All other occupations.....	355	0.3	321	0.3	35	0.1	-	-

¹College or university teachers of science or engineering are excluded from teachers and included in occupation corresponding to subject taught.

Table 2. Selected Educational Characteristics of Physical Scientists: 1978

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Selected educational characteristics	Physical scientists, total		Chemists		Physicists and astronomers		Other physical scientists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
HIGHEST DEGREE HELD								
Total.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
With a degree.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
Associate.....	-	-	-	-	-	-	-	-
Bachelor's.....	42,779	32.9	35,210	38.3	5,283	16.7	2,286	36.3
Master's.....	22,779	17.5	15,817	17.2	5,687	18.0	1,274	20.2
Doctorate.....	64,106	49.3	40,719	44.3	20,653	65.3	2,734	43.4
Professional/medical.....	254	0.2	254	0.3	-	-	-	-
Other.....	-	-	-	-	-	-	-	-
No degree.....	-	-	-	-	-	-	-	-
Not reported.....	-	-	-	-	-	-	-	-
MAJOR FIELD OF STUDY FOR HIGHEST DEGREE HELD								
Total.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
Computer science and systems analysis.....	57	(Z)	32	(Z)	26	(Z)	-	-
Engineering.....	3,762	2.9	2,099	2.3	961	3.0	702	11.1
Mathematical sciences.....	503	0.4	256	0.3	87	0.3	160	2.5
Agricultural sciences.....	915	0.7	532	0.6	-	-	384	6.1
Biological sciences.....	10,954	8.4	10,724	11.7	44	0.1	186	3.0
Medical sciences.....	662	0.5	555	0.6	58	0.2	49	0.8
Chemistry.....	75,139	57.8	74,045	80.5	237	0.8	856	13.6
Physics and astronomy.....	33,133	25.5	922	1.0	29,349	92.8	2,841	45.1
Earth, space, and marine sciences.....	591	0.5	173	0.2	99	0.3	318	5.1
Psychology.....	59	(Z)	29	(Z)	30	(Z)	-	-
Economics.....	-	-	-	-	-	-	-	-
Sociology and anthropology.....	60	(Z)	37	(Z)	13	(Z)	10	0.2
Other social sciences.....	437	0.3	27	(Z)	58	0.2	352	5.6
Business and commerce.....	686	0.5	619	0.7	46	0.1	21	0.3
All other fields.....	2,427	1.9	1,553	1.7	460	1.5	415	6.6
All fields below BA.....	79	(Z)	66	(Z)	14	(Z)	-	-
Field not reported.....	475	0.4	333	0.4	142	0.4	-	-
SUPPLEMENTAL TRAINING IN 1977¹								
Total.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
With supplemental training in 1977.....	50,397	38.8	37,589	40.9	9,895	31.3	2,913	46.3
On-the-job training.....	24,931	19.2	19,088	20.7	4,060	12.8	1,783	28.3
Military training applicable to								
civilian occupations.....	508	0.4	266	0.3	242	0.8	-	-
Extension or correspondence courses.....	4,814	3.7	3,680	4.0	953	3.0	181	2.9
Employer training programs.....	18,536	14.3	14,265	15.5	3,419	10.8	853	13.6
Adult education center.....	6,206	4.8	4,425	4.8	1,338	4.2	443	7.0
Other training.....	13,450	10.4	9,895	10.8	2,682	8.5	872	13.9
No supplemental training in 1977.....	66,520	51.2	44,777	48.7	19,107	60.4	2,635	41.9
Not reported.....	13,001	10.0	9,635	10.5	2,620	8.3	746	11.9

¹Sum of types of training may exceed total with training because of multiple response.

Table 3. Years of Professional Experience, Field of Science or Engineering in 1976, and Job Mobility of Physical Scientists in 1978

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Professional experience, field in 1976, and job mobility	Physical scientists, total		Chemists		Physicists and astronomers		Other physical scientists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
YEARS OF PROFESSIONAL EXPERIENCE								
Total persons.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
With years of professional experience reported...	126,825	97.6	89,592	97.4	31,027	98.1	6,205	98.6
Less than 1 year.....	355	0.3	179	0.2	176	0.6	-	-
1 to 5 years.....	4,652	3.6	3,368	3.7	1,133	3.6	151	2.4
6 to 10 years.....	20,014	15.4	12,230	13.3	6,598	20.9	1,187	18.9
11 to 15 years.....	25,945	20.0	18,155	19.7	6,708	21.2	1,081	17.2
16 to 20 years.....	20,856	16.1	14,183	15.4	5,480	17.3	1,193	18.9
21 to 25 years.....	17,995	13.9	12,576	13.7	4,600	14.5	820	13.0
26 to 30 years.....	17,118	13.2	13,025	14.2	3,029	9.6	1,064	16.9
31 to 35 years.....	7,634	5.9	6,202	6.7	1,224	3.9	208	3.3
36 to 40 years.....	7,933	6.1	6,259	6.8	1,293	4.1	381	6.1
41 years or more.....	4,323	3.3	3,416	3.7	785	2.5	122	1.9
Median years of professional experience.....	19	(X)	20	(X)	17	(X)	19	(X)
Years of professional experience not reported....	29,619	2.6	1,057	1.8	20,149	2.8	591	2.0
FIELD OF SCIENCE OR ENGINEERING IN 1976								
Total persons.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
Computer specialists.....	321	0.2	79	0.1	225	0.7	17	0.3
Engineers.....	4,297	3.3	1,905	2.1	1,897	6.0	495	7.9
Mathematical specialists.....	84	0.1	28	(Z)	43	0.1	13	0.2
Mathematicians.....	84	0.1	28	(Z)	43	0.1	13	0.2
Statisticians.....	-	-	-	-	-	-	-	-
Life scientists.....	2,067	1.6	1,638	1.8	137	0.4	292	4.6
Agricultural scientists.....	231	0.2	93	0.1	-	-	138	2.2
Biologists.....	1,405	1.1	1,217	1.3	50	0.2	138	2.2
Medical scientists.....	430	0.3	328	0.4	86	0.3	16	0.3
Physical scientists.....	113,785	87.6	83,017	90.2	26,350	83.3	4,418	70.2
Chemists.....	83,342	64.1	82,504	89.7	70	0.2	768	12.2
Physicists and astronomers.....	26,351	20.3	163	0.2	25,466	80.5	722	11.5
Other physical scientists.....	4,092	3.1	350	0.4	814	2.6	2,928	46.5
Environmental scientists.....	948	0.7	38	(Z)	702	2.2	208	3.3
Earth scientists.....	700	0.5	38	(Z)	482	1.5	180	2.9
Atmospheric scientists.....	218	0.2	-	-	205	0.6	13	0.2
Oceanographers.....	30	(Z)	-	-	15	(Z)	15	0.2
Psychologists.....	-	-	-	-	-	-	-	-
Social scientists.....	129	0.1	-	-	19	0.1	110	1.7
Economists.....	19	(Z)	-	-	19	0.1	-	-
Sociologists and anthropologists.....	-	-	-	-	-	-	-	-
Other social scientists.....	110	0.1	-	-	-	-	110	1.7
Not in a field in 1976.....	4,285	3.3	2,726	3.0	1,062	3.4	497	7.9
Did not report in 1976.....	4,005	3.1	2,571	2.8	1,190	3.8	244	3.9
JOB MOBILITY								
Total employed in February 1978.....	118,936	100.0	82,773	100.0	30,135	100.0	6,028	100.0
Employed in February 1976.....	113,243	95.2	79,031	95.5	28,441	94.4	5,772	95.7
Job change since 1976.....	30,441	25.6	21,143	25.5	7,791	25.9	1,507	25.0
Occupation change.....	10,370	8.7	6,593	8.0	3,120	10.4	657	10.9
No occupation change.....	19,870	16.7	14,404	17.4	4,616	15.3	850	14.1
Occupation change not reported.....	201	0.2	146	0.2	55	0.2	-	-
Same job in 1976 and 1978.....	75,795	63.7	52,399	63.3	19,523	64.8	3,873	64.3
Not reported.....	7,007	5.9	5,488	6.6	1,127	3.7	392	6.5
Not employed or employment status not reported in February 1976.....	5,693	4.8	3,742	4.5	1,695	5.6	256	4.3
Employed in January 1974.....	112,466	94.6	78,631	95.0	28,072	93.2	5,763	95.6
Job change between 1974 and 1978.....	44,894	37.7	30,281	36.6	11,636	38.6	2,977	49.4
Occupation change.....	17,428	14.7	10,611	12.8	4,549	15.1	2,268	37.6
No occupation change.....	27,342	23.0	19,546	23.6	7,087	23.5	709	11.8
Occupation change not reported.....	124	0.1	124	0.2	-	-	-	-
Same job in 1974 and 1978.....	60,483	50.9	42,735	51.6	15,281	50.7	2,467	40.9
Not reported.....	7,088	6.0	5,614	6.8	1,156	3.8	319	5.3
Not employed or employment status not reported in February 1974.....	6,471	5.4	4,142	5.0	2,063	6.8	265	4.4
Employed in 1972.....	114,264	93.9	79,704	96.3	28,650	95.1	5,910	98.0
Job change between 1972 and 1978.....	58,405	49.1	40,262	48.6	14,510	48.1	3,633	60.3
Occupation change.....	23,038	19.4	13,935	16.8	6,283	20.8	2,820	46.8
No occupation change.....	35,223	29.6	26,203	31.7	8,207	27.2	813	13.5
Occupation change not reported.....	144	0.1	124	0.2	20	(Z)	-	-
Same job in 1972 and 1978.....	48,528	40.8	33,668	40.7	12,975	43.1	1,886	31.3
Not reported.....	7,331	6.2	5,774	7.0	1,165	3.9	392	6.5
Not employed or employment status not reported in 1972.....	4,672	3.9	3,069	3.7	1,486	4.9	118	2.0

Table 4. Employment Status and Selected Job-Related Characteristics of Physical Scientists:
1978

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Employment status and selected job-related characteristics	Physical scientists, total		Chemists		Physicists and astronomers		Other physical scientists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
EMPLOYMENT STATUS IN FEBRUARY 1978								
Total.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
In labor force.....	120,220	92.5	83,860	91.2	30,318	95.9	6,041	96.0
Employed.....	118,936	91.5	82,773	90.0	30,135	95.3	6,028	95.8
Full time.....	115,132	88.6	79,964	86.9	29,424	93.0	5,744	91.3
Part time.....	3,755	2.9	2,773	3.0	699	2.2	284	4.5
Seeking full-time work.....	771	0.6	547	0.6	204	0.6	20	0.3
Not seeking full-time work.....	2,969	2.3	2,210	2.4	496	1.6	264	4.2
Not reported.....	15	(Z)	15	(Z)	-	-	-	-
Full or part time not reported.....	49	(Z)	37	(Z)	12	(Z)	-	-
Unemployed.....	1,283	1.0	1,087	1.2	183	0.6	13	0.2
Not in labor force.....	9,698	7.5	8,140	8.8	1,305	4.1	253	4.0
Retired.....	7,904	6.1	6,598	7.2	1,090	3.4	216	3.4
Student.....	308	0.2	250	0.3	57	0.2	-	-
Family responsibilities.....	1,330	1.0	1,256	1.4	38	0.1	37	0.6
Could not find work.....	28	(Z)	-	-	28	(Z)	-	-
Other.....	129	(Z)	37	(Z)	92	0.3	-	-
FULL-TIME EMPLOYMENT IN SCIENCE OR ENGINEERING IN 1978								
Total employed full time in February 1978..	115,132	100.0	79,964	100.0	29,424	100.0	5,744	100.0
In science or engineering.....	113,004	98.2	78,239	97.8	29,135	99.0	5,630	98.0
Not in science or engineering.....	2,128	1.8	1,725	2.2	289	1.0	114	2.0
Preferred nonscience or nonengineering.....	203	0.2	136	0.2	67	0.2	-	-
Promoted out of science or engineering.....	1,133	1.0	919	1.1	116	0.4	97	1.7
Pay better in nonscience or nonengineering....	90	(Z)	90	0.1	-	-	-	-
Locational preference.....	174	0.2	174	0.2	-	-	-	-
Science or engineering position not available..	235	0.2	163	0.2	72	0.2	-	-
Other reason.....	258	0.2	208	0.3	34	0.1	17	0.3
Reason not reported.....	35	(Z)	35	(Z)	-	-	-	-
UNEMPLOYMENT IN CALENDAR YEAR 1977								
Total.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
Unemployed in calendar year 1977.....	4,032	3.1	3,117	3.4	640	2.0	276	4.4
1 to 4 weeks.....	497	0.4	480	0.5	18	(Z)	-	-
5 to 10 weeks.....	686	0.5	624	0.7	42	0.1	20	0.3
11 to 14 weeks.....	717	0.6	556	0.6	97	0.3	64	1.0
15 to 26 weeks.....	656	0.5	570	0.6	72	0.2	13	0.2
27 weeks or more.....	1,293	1.0	778	0.8	391	1.2	124	2.0
Median weeks of unemployment.....	15	(X)	14	(X)	27+	(X)	*27+	(X)
Weeks of unemployment not reported.....	184	0.1	109	0.1	20	(Z)	54	0.9
Not unemployed in calendar year 1977.....	123,445	95.0	86,920	94.5	30,563	96.6	5,961	94.7
Not reported.....	2,441	1.9	1,964	2.1	420	1.3	57	*0.9
INDUSTRY IN 1978								
Total employed in 1978.....	118,936	100.0	82,773	100.0	30,135	100.0	6,028	100.0
Agriculture, forestry, and fisheries.....	861	0.7	732	0.9	16	(Z)	113	1.9
Mining and petroleum extraction.....	511	0.4	318	0.4	145	0.5	48	0.8
Construction.....	189	0.2	63	(Z)	126	0.4	-	-
Manufacturing, total.....	50,954	42.8	43,335	52.4	6,080	20.2	1,539	25.5
Primary metal industries.....	1,093	0.9	1,035	1.3	59	0.2	-	-
Fabricated metal industries.....	549	0.5	422	0.5	83	0.3	44	0.7
Machinery, except electrical.....	237	0.2	172	0.2	66	0.2	-	-
Electrical machinery equipment and supplies....	1,016	0.9	611	0.7	391	1.3	14	0.2
Electronic machinery and computing equipment...	5,009	4.2	1,863	2.3	2,905	9.6	241	4.0
Aircraft and aircraft parts.....	1,058	0.9	457	0.6	460	1.5	141	2.3
Motor vehicles and motor vehicle equipment.....	1,172	1.0	896	1.1	215	0.7	61	1.0
Ordnance.....	1,234	1.0	634	0.8	489	1.6	112	1.9
Chemicals and allied products.....	29,490	24.8	28,779	34.8	292	1.0	419	6.9
Petroleum refining and related industries.....	3,024	2.5	2,683	3.2	301	1.0	40	0.7
Other manufacturing.....	7,072	5.9	5,784	7.0	820	2.7	468	7.8
Transportation, communications, and other public utilities.....	1,233	1.0	671	0.8	548	1.8	14	0.2
Wholesale and retail trade.....	274	0.2	258	0.3	16	(Z)	-	-
Finance, insurance, and real estate.....	238	0.2	177	0.2	20	(Z)	41	0.7
Educational institutions, total.....	28,104	23.6	16,232	19.6	10,870	36.1	1,002	16.6
College or university.....	23,240	19.5	12,690	15.3	9,663	32.1	887	14.7
Other.....	4,864	4.1	3,542	4.3	1,207	4.0	115	1.9

Table 4. Employment Status and Selected Job-Related Characteristics of Physical Scientists: 1978—Continued

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Employment status and selected job-related characteristics	Physical scientists, total		Chemists		Physicists and astronomers		Other physical scientists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
INDUSTRY IN 1978--Continued								
Health services.....	2,886	2.4	2,518	3.0	325	1.1	43	0.7
Services, except education and health, total.....	20,835	17.5	9,694	11.7	9,396	31.2	1,744	28.9
Engineering and architectural services.....	1,154	1.0	350	0.4	731	2.4	73	1.2
Research institutions.....	17,399	14.6	7,770	9.4	8,074	26.8	1,554	25.8
Other.....	2,282	1.9	1,574	1.9	591	2.0	117	1.9
Public administration.....	5,943	5.0	3,738	4.5	1,289	4.3	916	15.2
Federal.....	2,423	2.0	1,358	1.6	810	2.7	254	4.2
Other.....	3,394	2.9	2,270	2.7	463	1.5	662	11.0
Military.....	126	0.1	110	0.1	16	(Z)	-	-
Other industries.....	6,351	5.3	4,631	5.6	1,168	3.9	553	9.2
Not reported.....	557	0.5	406	0.5	138	0.5	13	0.2
TYPE OF EMPLOYER IN 1978								
Total employed in February 1978.....	118,936	100.0	82,773	100.0	30,135	100.0	6,028	100.0
Business or industry.....	65,923	55.4	52,570	63.5	10,967	36.4	2,387	39.6
Educational institutions, total.....	29,634	24.9	16,848	20.4	11,509	38.2	1,276	21.2
Junior or 2-year college, technical institute...	2,196	1.8	1,051	1.3	1,073	3.6	72	1.2
Medical school.....	2,654	2.2	2,580	3.1	18	(Z)	56	0.9
4-year college or university, except medical school.....	24,387	20.5	12,898	15.6	10,342	34.3	1,147	19.0
Elementary or secondary school system.....	397	0.3	319	0.4	77	0.3	-	-
Hospital or clinic.....	1,070	0.9	904	1.1	136	0.5	30	0.5
Nonprofit organization.....	4,015	3.4	2,055	2.5	1,785	5.9	175	2.9
U.S. military service/commissioned groups.....	243	0.2	212	0.3	31	0.1	-	-
Government, total.....	16,893	14.2	9,495	11.5	5,252	17.4	2,146	35.6
Federal.....	12,189	10.2	6,186	7.5	4,534	15.0	1,468	24.4
State.....	1,555	1.3	1,242	1.5	154	0.5	159	2.6
Local or other.....	3,149	2.6	2,067	2.5	564	1.9	519	8.6
International agency.....	74	(Z)	-	-	74	0.2	-	-
Other.....	144	0.1	86	0.1	58	0.2	-	-
Not reported.....	941	0.8	603	0.7	324	1.1	14	0.2
PRIMARY WORK ACTIVITY IN 1978								
Total employed in February 1978.....	118,936	100.0	82,773	100.0	30,135	100.0	6,028	100.0
Research and development.....	49,886	41.9	34,351	41.5	12,735	42.3	2,800	46.5
Basic research.....	15,018	12.6	9,298	11.2	5,199	17.3	522	8.7
Applied research.....	19,390	16.3	13,166	15.9	4,907	16.3	1,317	21.9
Development.....	14,841	12.5	11,760	14.2	2,148	7.1	933	15.5
Design.....	637	0.5	127	0.2	482	1.6	28	0.5
Management or administration, total.....	31,085	26.1	21,787	26.3	7,648	25.4	1,650	27.4
Research and development.....	19,699	16.6	13,459	16.3	5,115	17.0	1,125	18.7
Other.....	11,386	9.6	8,328	10.1	2,533	8.4	524	8.7
Teaching and training.....	17,096	14.4	9,743	11.8	6,653	22.1	700	11.6
Production and inspection.....	12,362	10.4	11,183	13.5	791	2.6	388	6.4
Quality control.....	8,598	7.2	8,077	9.8	386	1.3	135	2.2
Operations.....	2,838	2.4	2,300	2.8	301	1.0	237	3.9
Distribution-sales.....	926	0.8	806	1.0	104	0.3	15	0.3
Consulting.....	2,269	1.9	1,593	1.9	455	1.5	221	3.7
Clinical diagnosis.....	378	0.3	348	0.4	30	(Z)	-	-
Consulting.....	1,892	1.6	1,245	1.5	425	1.4	221	3.7
Report writing, statistical work, and computer applications.....	3,204	2.7	1,916	2.3	1,113	3.7	174	2.9
Report writing.....	2,151	1.8	1,691	2.0	316	1.0	144	2.4
Statistical work.....	134	0.1	103	0.1	31	0.1	-	-
Computer applications.....	918	0.8	122	0.1	766	2.5	30	0.5
Other activities.....	1,750	1.5	1,513	1.8	156	0.5	80	1.3
Not reported.....	1,286	1.1	688	0.8	584	1.9	14	0.2

**Table 4. Employment Status and Selected Job-Related Characteristics of Physical Scientists:
1978—Continued**

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Employment status and selected job-related characteristics	Physical scientists, total		Chemists		Physicists and astronomers		Other physical scientists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
NATIONAL INTEREST TOPICS¹								
Total.....	129,918	100.0	92,001	100.0	31,623	100.0	6,294	100.0
Health.....	17,002	13.1	15,577	16.9	1,048	3.3	377	6.0
Education, total.....	17,129	13.2	19,758	10.6	6,733	21.3	639	10.1
Teaching.....	15,738	12.1	8,880	9.7	6,229	19.7	629	10.0
Other.....	1,390	1.1	877	1.0	504	1.6	9	0.1
Environmental protection pollution control.....	16,408	12.6	14,523	15.8	981	3.1	904	14.4
Space.....	3,591	2.8	491	0.5	2,591	8.2	510	8.1
National defense.....	12,246	9.4	3,065	3.3	7,900	25.0	1,281	20.4
Crime prevention and control.....	813	0.6	641	0.7	97	0.3	75	1.2
Food production and technology.....	4,957	3.8	4,847	5.3	53	0.2	57	0.9
Energy and fuel.....	13,818	10.6	8,790	9.6	4,474	14.1	554	8.8
Other mineral resources.....	1,027	0.8	834	0.9	81	0.3	11.3	1.8
Community development and services.....	372	0.3	227	0.2	13	(Z)	132	2.1
Housing.....	206	0.2	85	(Z)	64	0.2	57	0.9
Other.....	4,895	3.8	3,293	3.6	1,170	3.7	432	6.9
Not applicable.....	26,457	20.4	21,665	23.5	3,906	12.4	886	14.1
Not reported.....	10,996	8.5	8,204	8.9	2,513	7.9	279	4.4
FEDERAL SUPPORT IN 1978²								
Total employed in February 1978.....	118,936	100.0	82,773	100.0	30,135	100.0	6,028	100.0
With Federal support.....	47,421	39.9	24,715	29.9	19,161	63.6	3,545	58.8
Department of Agriculture.....	2,309	1.9	1,905	2.3	178	0.6	226	3.8
Department of Commerce.....	1,388	1.2	555	0.7	670	2.2	163	2.7
Department of Defense.....	14,688	12.3	4,809	5.8	8,765	29.1	1,114	18.5
Department of Energy.....	11,788	9.9	4,953	6.0	6,130	20.3	705	11.7
Department of Health, Education, and Welfare...	9,257	7.8	8,177	9.9	863	2.9	217	3.6
Department of Housing and Urban Development....	341	0.3	69	(Z)	141	0.5	131	2.2
Department of the Interior.....	1,503	1.3	955	1.2	115	0.4	433	7.2
Department of Justice.....	569	0.5	365	0.4	129	0.4	75	1.2
Department of Labor.....	258	0.2	149	0.2	109	0.4	-	-
Department of Transportation.....	777	0.7	557	0.7	122	0.4	97	1.6
Agency for International Development.....	380	0.3	367	0.4	13	(Z)	-	-
Environmental Protection Agency.....	3,364	2.8	2,828	3.4	341	1.1	195	3.2
NASA.....	5,589	4.7	1,458	1.8	3,544	11.8	587	9.7
National Science Foundation.....	7,518	6.3	3,482	4.2	3,733	12.4	304	5.0
Nuclear Regulatory Commission.....	933	0.8	470	0.6	407	1.4	56	0.9
Other Department or agency.....	2,075	1.7	1,412	1.7	485	1.6	178	3.0
Agency not known.....	499	0.4	338	0.4	147	0.5	14	0.2
Agency not reported.....	642	0.5	493	0.6	57	0.2	92	1.5
No Federal support.....	65,836	55.4	53,764	65.0	9,853	32.7	2,219	36.8
Federal support not known.....	4,305	3.6	3,301	4.0	827	2.7	177	2.9
Not reported.....	1,374	1.2	993	1.2	294	1.0	87	1.4

¹Area of national concern in which persons devoted the largest proportion of professional time.

²Sum of individual agencies support may exceed total with Federal support because of multiple response.

Table 5. Basic Annual Salary Rate of Full-Time Employed Physical Scientists: 1978

(Detail may not add to total because of rounding. For meaning of symbols, see text)

Salary	Physical scientists, total		Chemists		Physicists and astronomers		Other physical scientists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total employed full time in February 1978.....	115,132	100.0	79,964	100.0	29,424	100.0	5,744	100.0
With salary ¹ reported.....	109,631	95.2	75,935	95.0	28,273	96.1	5,423	94.4
Less than \$8,000.....	275	0.2	112	0.1	163	0.6	-	-
\$8,000 to \$9,999.....	192	0.2	153	0.2	39	0.1	-	-
\$10,000 to \$14,999.....	3,429	3.0	2,807	3.5	521	1.8	101	1.8
\$15,000 to \$19,999.....	13,622	11.8	11,263	14.1	2,014	6.8	346	6.0
\$20,000 to \$24,999.....	23,055	20.0	17,078	21.4	5,111	17.4	866	15.1
\$25,000 to \$29,999.....	25,233	21.9	16,059	20.1	7,402	25.2	1,772	30.8
\$30,000 to \$39,999.....	30,858	26.8	19,741	24.7	9,280	31.5	1,837	32.0
\$40,000 to \$49,999.....	9,636	8.4	6,366	8.0	2,841	9.7	429	7.5
\$50,000 and over.....	3,330	2.9	2,357	2.9	901	3.1	72	1.3
Median salary.....(dollars)..	27,329	(X)	26,525	(X)	29,052	(X)	28,390	(X)
Salary not reported.....	5,501	4.8	4,028	5.0	1,151	3.9	321	5.6

¹Refers to salary for job held during the week of February 12-18, 1978.

Appendix A. Definitions and Explanations

The 1978 National Survey of Natural and Social Scientists and Engineers was the fourth survey based on the 1970 population of scientists and engineers. It was conducted by the Bureau of the Census for the National Science Foundation. The first survey, the 1972 Professional, Technical, and Scientific Manpower Survey,¹ was conducted among a nationwide sample of approximately 150,000 persons who were recorded in the 1970 Census of Population as being in the experienced civilian labor force in 1 of 63 engineering, scientific, or related occupations. The survey also included a small sample of persons who had completed 4 or more years of college, but were not in any of the specified occupations. Based on responses in the 1972 survey and on criteria established by the National Science Foundation, approximately 50,000 persons from the 1972 survey sample (excluding the small sample of college graduates) were chosen as the sample for the series of longitudinal surveys known as the National Sample of Scientists and Engineers. The 1978 National Survey of Natural and Social Scientists and Engineers was the third survey in this longitudinal series; it was preceded by surveys in 1976 and 1974.²

Questionnaires for the 1978 survey were mailed in February 1978. After all data collection activities, 81 percent of the sample (approximately 40,800 persons) completed their questionnaires. The 19 percent who did not complete their questionnaires included persons who refused to participate, the deceased, and persons who returned questionnaires with insufficient information to permit processing. For an analysis of response, see appendix E.

The estimates derived for this survey were prepared by using a ratio estimation procedure and an adjustment for nonresponse in 1978. For each sample case for which a completed questionnaire was obtained, the information from the 1978 survey was matched with the 1972 survey data and the 1970 census data for the same person. Weights applied to sample cases in the 1972 survey were then used to weight the resultant matched data file. The weighting procedure for the 1972 survey involved first the preparation of a preliminary estimate by weighting the results for each sample

person by the reciprocal of the probability of selection. As a second step, these weights were adjusted by applying a factor for certain age-sex-race cells within each occupation category. Within each of the cells, the factor was computed as the ratio of the 1970 census count to the preliminary estimate. The final 1972 weight was this factor multiplied by the inverse of the probability of selection for each person. To the extent that the data being tabulated and the estimated count of persons in the cells are positively correlated, the ratio estimate procedure will improve the reliability of the estimate. A discussion of the reliability of the estimates, including a description of the standard errors of totals and percentages, is presented in appendix B.

A nonresponse adjustment was done in 1978 to reduce the bias in the survey estimates due to the high nonresponse rate in 1978. This adjustment was done separately for in-scope³ and out-of-scope⁴ persons, and included an adjustment for the mortality in the longitudinal sample from 1972 to 1978. The first step in the nonresponse adjustment was to adjust the nonrespondents for mortality from 1972 to 1978 by means of mortality tables for age-race-sex groups. The second step was to determine the estimated proportion of nonrespondents that were in-scope and out-of-scope. To estimate these proportions, an intensive follow-up was conducted to obtain interviews for a subsample of the 1978 nonrespondents. This follow-up showed that approximately 80 percent of the nonrespondents were in-scope and the remaining 20 percent were out-of-scope. The final step was to determine a nonresponse adjustment factor for different age-race-sex cells. Within each of the cells, the factor was computed as the ratio of the weighted count, using the 1972 weights, of the estimated total (i.e., respondent and nonrespondent) in-scope or out-of-scope persons, divided by the weighted count of the respondent in-scope or out-of-scope persons.

The final weight for the 1978 survey was the product of the 1972 weight and the appropriate 1978 nonresponse adjustment factor.

The definitions for many of the characteristics shown in this report are self-explanatory or can best be understood by referring to the appropriate 1978 questionnaire items or reference lists (appendixes C and D). An explanation of the other subjects is provided below.

Age in 1978. The reference period for age in 1978 was April 1978. The age classification is based on the age of the person at his or her last birthday. The median age is that age that

¹ For a description of the 1972 survey and related matters, see U.S. Bureau of the Census, *Characteristics of Persons in Engineering and Scientific Occupations: 1972*, Technical Paper No. 33, U.S. Government Printing Office, Washington, D.C., 1974.

² Results from the 1974 survey were published in U.S. Bureau of the Census, *Current Population Reports*, Series P-23, No. 53, *Selected Characteristics of Persons in Fields of Science or Engineering: 1974*, U.S. Government Printing Office, Washington, D.C., 1975; results from the 1976 survey were published in U.S. Bureau of the Census, *Current Population Reports*, Series P-23, No. 76, *Selected Characteristics of Persons in Fields of Science or Engineering: 1976*, U.S. Government Printing Office, Washington, D.C., 1978.

³ "In-scope" means "in a field of science or engineering."

⁴ "Out-of-scope" refers to the category "not in a field of science or engineering."

divides the distribution into two equal parts, one-half being older than the median age and one-half younger. Median ages were divided from an estimation process that distributed the subject populations into 5-year age groups.

Race. The data on race are based on responses in the 1970 Census of Population. The "other races" category includes all races not included in the specific categories listed.

Divisions of the United States. The divisions of the United States comprise the following States:

New England: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont

Middle Atlantic: New York, New Jersey, Pennsylvania

East North Central: Illinois, Indiana, Michigan, Ohio, Wisconsin.

West North Central: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota.

South Atlantic: Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia.

East South Central: Alabama, Kentucky, Mississippi, Tennessee.

West South Central: Arkansas, Louisiana, Oklahoma, Texas.

Mountain: Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming.

Pacific: Alaska, California, Hawaii, Oregon, Washington.

Outlying areas of the United States include Puerto Rico, Guam, Virgin Islands, American Samoa, and Canal Zone.

Fields of science and engineering. Science or engineering (S/E) fields are categories established by the survey sponsor, the National Science Foundation, to identify persons who could be classified as engineers or scientists under most definitions. In general, to be classified into one of the fields, a person had to have at least two of the following three characteristics: (1) employment in the field, (2) attainment of a specified educational level in an academic discipline related to the field, or (3) self-identification, based upon total education and experience, as being in the field. More detailed information on the criteria for membership in a scientific and technical field is given in U.S. Bureau of the Census, Current Population Reports, Series P-23, No. 76, *Selected Characteristics of Persons in Fields of Science or Engineering: 1976*, U.S. Government Printing Office, Washington, D.C., 1978.

Highest degree held. Highest degree held in 1978 refers to the highest academic degree awarded to the respondent in 1978 or earlier. Data on highest degree held were derived as follows: The level and the year of award of the highest

degree received by the respondent between January 1972 and 1978 surveys (this degree will be referred to as degree "A") were compared with the level and year of award, determined from the 1976, 1974, and 1972 surveys, of the previously-designated highest degree held by the respondent (this is referred to as degree "B"). If degree A was at the same level or at a higher level than degree B, and if its date of award was later than that of degree B, degree A was designated as the highest degree held in 1978; otherwise, degree B was designated as the highest degree held in 1978.

The "other degree" category includes persons whose highest academic degree was one of the following: RN, LLB, MD, and academic degrees other than those shown in the tables.

Major field of study for highest degree held. The data on major field of study refer to the major subject associated with the highest degree held in 1978 determined by the method described above. For persons who received their highest degree held in 1978 after January 1972, the data are derived from question 3 of the 1978 questionnaire (see appendix C), or question 1, part b of the 1976 questionnaire or from question 2, part b5 of the 1974 questionnaire. For persons who received their highest degree in 1971 or earlier, the data on major subject are based on the 1972 survey.

Employment status. Employed persons are those who reported that they were employed, either full time or part time, on vacation, or otherwise temporarily absent from a job for health or personal reasons during the reference week (February 12-18, 1978). The unemployed are persons who marked the "unemployed and seeking work" category (box 3) of item 5a of the 1978 questionnaire (see appendix C), or who indicated in item 7 that they were on layoff from a job. All other persons were classified as "not in the labor force."

Unemployment in 1977. The data on unemployment in 1977 relate to the occurrence of unemployment during the entire calendar year rather than just during a reference week. Medians are based on the intervals shown in the tables.

Primary work activity in 1978. The data on primary work activity in 1978 were derived, in general, from answers to question 11b of the 1978 questionnaire. In certain instances of nonresponse to question 11b, however, the data were derived from an imputation procedure that used responses to question 11a.

Type of employer. The data on type of employer in 1978 are based entirely on responses to question 12 of the 1978 questionnaire.

Basic annual salary rate. The statistics on salary refer to the basic annual salary associated with the job held in February 1978. The figures relate to salary before deductions for income tax, Social Security, retirement, etc., but do not include bonuses, overtime pay, or earnings from secondary jobs. For employees of educational institutions whose salary was for 9 or 10 months, the salary rate was adjusted to a 12-month basis. Median salaries were derived by an estimation process that distributed the subject population into \$1,000 intervals.

Job and occupational mobility in 1976 and 1978. The data on mobility between 1976 and 1978 were derived from answers on both the 1976 and 1978 questionnaires. Persons were classified as with a "job change between 1976 and 1978" if they were employed in both 1976 and 1978 and reported in the 1978 survey that their current job began in 1976 or later. Persons were classified as "same job in 1976 and 1978" if the beginning date of their most recent job was in 1975 or earlier, and as "not reported" if they did not report the beginning date of the most recent job. For persons with a job change, the detailed occupation of the 1978 job was compared with that of the 1976 job, and persons were classified as with the same or a different occupation or as "occupation change not reported."

Job and occupational mobility in 1974 and 1978 and in 1972 and 1978. The data on mobility between 1974 and 1978 and between 1972 and 1978 were derived from answers on the 1974 and 1978 questionnaires and 1972 and 1978 questionnaires, respectively. The procedure was analogous to that described for the data on job and occupational mobility in 1976 and 1978.

Years of professional experience. Median years of professional experience are based on 1-year intervals.

Symbols. A dash (—) represents zero, and "X" means "not applicable." The symbol "Z" means less than 0.05 percent. The symbol "*" means based on fewer than 20 sample cases. For the characteristic "Unemployment in Calendar Year 1977," the symbol "27+" means that the median fell in the category "27 weeks or more."

Appendix B. Reliability of the Estimates and Standard Errors of Totals and Percentages

There are two types of possible errors associated with estimates based on data from a sample survey—sampling and nonsampling error. The following is a description of the sampling and nonsampling errors associated with the 1978 Survey of Scientists and Engineers.

SAMPLING ERRORS

The particular sample used for this survey is one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same schedules and instructions were used, estimates from each of the different samples would differ from each other. The deviation of a sample estimate from the average of all possible samples is defined as the sampling error. The standard error of a survey estimate attempts to provide a measure of this variation among the estimates from the possible samples, and thus, is a measure of the precision with which an estimate from the sample approximates the average result of all possible samples.

As calculated for this survey, the standard error also partially measures the variation in the estimates due to response errors (nonsampling errors), but it does not measure, as such, any systematic biases in the data. Therefore, the accuracy of the estimates depends on both the sampling and nonsampling errors, measured by the standard error, and biases and some additional nonsampling errors not measured by the standard error.

The figures presented in the tables B-1 to B-4 below are approximations to the standard errors of the various estimates for this survey. A number of approximations and generalizations have been used so that the standard errors would be applicable to a wide variety of characteristics and still be prepared at a moderate cost. Thus, the standard errors in the following tables provide an indication of the order of magnitude rather than precise measurements of the standard errors.

Standard errors on totals. Table B-1 presents the standard errors applicable to estimated totals for characteristics of physical scientists. Linear interpolation can be used to determine standard errors for estimated totals not specifically shown in table B-1. In addition, standard errors for estimated numbers not shown in these tables may also be computed directly from the following standard error formula:

$$\text{standard error of } x = \sqrt{ax^2 + bx}$$

The "a" and "b" parameters for each physical scientist group are:

Field	"a" parameter	"b" parameter
Physical scientists, total	.0000552	31.7
Chemists	.0000585	34.5
Physicists and Astronomers	.000549	31.6
Other physical scientists	.00476	28.6

For example, there are an estimated 7904 physical scientists, total, who were retired in 1978. The above table shows that $a = .0000552$ and $b = 31.7$ for physical scientists, total. Thus, the estimated standard error of 7904 is

$$\sqrt{(.0000552)(7904)^2 + (31.7)(7904)} = 504$$

Standard errors on percentages. The reliability of an estimated percentage, computed by using sample data for both the numerator and the denominator, depends upon both the size of the percentage and the size of the total upon which the percentage is based. Estimated percentages are relatively more reliable than the corresponding estimates of the numerators of the percentage, particularly if the percentages are 50 percent or more.

Tables B-2 to B-4 present the standard errors of estimated percentages for physical scientists. Two-way linear interpolation can be used to determine standard errors for estimated percentages not specifically shown in tables B-2 to B-4. In addition, the standard errors for percentages not shown in these tables can also be computed directly from the following formula¹:

standard error of the percentage p on a base of y

$$= \sqrt{(p)(100-p) \frac{b}{y}}$$

For example, an estimated 2.9 percent of the 129,918 physical scientists, total, worked part-time in 1978. The above table shows that $b = 31.7$ for physical scientists, total.

¹ The tables for the standard errors of percentages for most scientific and engineering fields (SEF's) were combined. The tables of standard errors given for such collapsed groups are always conservative, i.e., the table for the SEF with the largest standard errors was chosen to represent all the SEF's in the group. Because of this, the standard errors calculated directly from the formula may differ slightly from those found in the tables.

Thus, the standard error for the 2.9 percent on a base of 129,918 is

$$\sqrt{\frac{(2.9)(100-2.9)(31.7)}{129,918}} = .26 \text{ percent}$$

Standard error intervals. The sample estimate and its estimated standard error enable one to construct interval estimates that include the average result of all possible samples with a known probability. For example, if all possible samples were selected, each of these surveyed under identical conditions and an estimate and its estimated standard error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below the estimate to one standard error above the estimate would include the average result of all possible samples;
2. Approximately 90 percent of the intervals from 1.6 standard errors below the estimate to 1.6 standard errors above the estimate would include the average result of all possible samples;
3. Approximately 95 percent of the intervals from two standard errors below the estimate to two standard errors above the estimate would include the average result of all possible samples.

The average result of all possible samples either is or is not contained in any particular computed interval. However, for a particular sample one can say with specified confidence that the average result of all possible samples is included within the constructed interval.

For example, of the 129,918 physical scientists, total, in 1978, 17.5 percent have the Master's degree as the highest degree held in 1978. The standard error of this percent as computed from table B-2 is .6 percentage points. Based on these data, we may conclude that the percentage of physical scientists, total, with the Master's degree as the highest degree held in 1978 lies between 16.3 percent and 18.7 percent with 95 percent confidence, i.e., within 2 standard errors.

All the statements of comparison appearing in the text of this report are significant at a level of more than 2.0 standard errors. This means that for the differences cited in the text, the estimated difference is greater than twice the standard error of the difference.

Standard errors of differences between estimates. The figures in these tables are not directly applicable to standard errors of differences between two sample estimates. The standard error of the estimated difference between two figures may be approximated by the square root of the sum of the squares of the standard error of each estimate. This approximation will yield an exact result when the two characteristics are uncorrelated. If the two characteristics are positively (negatively) correlated, the approximation will overestimate (underestimate) the standard error of the difference. For a difference between two sample estimates, one of which

represents a subclass of the other, the table can be used with the difference considered as the sample estimate.

For example, of the 129,918 physical scientists, total, in 1978, 49.3 percent have the PH.D. as the highest degree held in 1978. The standard error of this percent as computed from table B-2 is .8 percentage points. The standard error of the difference between the percentage of those with Master's degrees and the percentage of those with Doctorates (i.e., 49.3 - 17.5 = 31.8 percent) is then approximately

$$\sqrt{(.6)^2 + (.8)^2} = 1 \text{ percentage point}$$

Based on these data, we may conclude with 95-percent confidence that the average estimate of the difference of the percentages derived from all possible sample lies within the interval 29.8 percentage points to 33.8 percentage points.

Table B-1. Standard Errors of Totals

Size of estimate	Chemists; physical scien- tists, total	Physi- cists and astron- omers	Other physical scientists
100.....	60	60	50
200.....	80	80	80
500.....	130	130	120
700.....	160	150	150
1,000.....	190	180	180
2,500.....	290	290	320
5,000.....	420	410	510
10,000.....	590	610	870
25,000.....	950	1,060	-
50,000.....	1,370	1,720	-
75,000.....	1,710	-	-
100,000.....	2,010	-	-
150,000.....	2,450	-	-

- Represents zero.

Standard errors of medians. The figures in these tables are not directly applicable to standard errors of estimated medians. The sampling variability of an estimated median depends upon the size of the base as well as on the distribution from which the median is determined. An approximate method for measuring the reliability of a median is to determine an interval about the estimated median, such that there is a stated degree of confidence that the median based on all possible samples lies within the interval. The following procedure may be used to estimate confidence limits of a median based on sample data:

1. Determine the standard error of a 50-percent characteristic from the appropriate standard error table (tables B-2 to B-4) using the appropriate base;
2. Add this standard error to 50 percent to obtain an upper boundary percentage and subtract this standard error from 50 percent to obtain a lower boundary percentage;

3. Using the cumulative distribution from which the median is derived, read off the numbers corresponding to the percentages. The interval between these two numbers (i.e., the confidence limits) will be the 68-percent confidence interval.

A 95-percent confidence interval may be determined by finding the values corresponding to 50 percent plus or minus twice the standard error in step (1).

Table B-2. Standard Errors of Percentages for Physical Scientists, Total, and Physicists/Astronomers

(68 chances out of 100)

Base of percentage	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
100.....	5.7	8.0	12.5	17.2	20.5	24.8	28.7
200.....	4.0	5.7	8.8	12.2	14.5	17.6	20.3
500.....	2.6	3.6	5.6	7.7	9.2	11.1	12.8
700.....	2.2	3.0	4.7	6.5	7.7	9.4	10.8
1,000.....	1.8	2.5	4.0	5.4	6.5	7.9	9.1
2,500.....	1.1	1.6	2.5	3.4	4.1	5.0	5.7
5,000.....	0.8	1.1	1.8	2.4	2.9	3.5	4.1
10,000.....	0.6	0.8	1.3	1.7	2.0	2.5	2.9
25,000.....	0.4	0.5	0.8	1.1	1.3	1.6	1.8
50,000.....	0.3	0.4	0.6	0.8	0.9	1.1	1.3
75,000.....	0.2	0.3	0.5	0.6	0.7	0.9	1.0
100,000.....	0.2	0.3	0.4	0.5	0.6	0.8	0.9
150,000.....	0.1	0.2	0.3	0.4	0.5	0.6	0.7

Table B-3. Standard Errors of Percentages for Other Physical Scientists

(68 chances out of 100)

Base of percentage	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
100.....	5.3	7.5	11.7	16.0	19.1	23.2	26.7
200.....	3.8	5.3	8.2	11.3	13.5	16.4	18.9
500.....	2.4	3.3	5.2	7.2	8.5	10.4	12.0
700.....	2.0	2.8	4.4	6.1	7.2	8.8	10.1
1,000.....	1.7	2.4	3.7	5.1	6.0	7.3	8.5
2,500.....	1.1	1.5	2.3	3.2	3.8	4.6	5.3
5,000.....	0.8	1.1	1.6	2.3	2.7	3.3	3.8
10,000.....	0.5	0.7	1.2	1.6	1.9	2.3	2.7
25,000.....	0.3	0.5	0.7	1.0	1.2	1.5	1.7
50,000.....	0.2	0.3	0.5	0.7	0.9	1.0	1.2

Table B-4. Standard Errors of Percentages for Chemists

(68 chances out of 100)

Base of percentage	1 or 99	2 or 98	5 or 95	10 or 90	15 or 85	25 or 75	50
100.....	5.9	8.3	12.9	17.7	21.1	25.6	29.6
200.....	4.2	5.9	9.1	12.5	14.9	18.1	20.9
500.....	2.6	3.7	5.8	7.9	9.4	11.4	13.2
700.....	2.2	3.1	4.9	6.7	8.0	9.7	11.2
1,000.....	1.9	2.6	4.1	5.6	6.7	8.1	9.3
2,500.....	1.2	1.7	2.6	3.5	4.2	5.1	5.9
5,000.....	0.8	1.2	1.8	2.5	3.0	3.6	4.2
10,000.....	0.6	0.8	1.3	1.8	2.1	2.6	3.0
25,000.....	0.4	0.5	0.8	1.1	1.3	1.6	1.9
50,000.....	0.3	0.4	0.6	0.8	0.9	1.1	1.3
75,000.....	0.2	0.3	0.5	0.6	0.8	0.9	1.1
100,000.....	0.2	0.3	0.4	0.6	0.7	0.8	0.9

For example, the data for 1978 indicate that the estimate of the median age for chemists is 45.9 years. The distribution of chemists by age is shown in the following table:

Age (years)	Percentage	Cumulative distribution
Under 30	0.7	0.7
30 to 34	11.9	12.6
35 to 39	18.5	31.1
40 to 44	16.3	47.4
45 to 49	14.4	61.8
50 to 54	12.7	74.5
55 to 59	11.4	85.9
60 to 64	7.2	93.1
65 to 69	4.8	97.9
70 and over	2.0	99.9

From standard error table B-4, the standard error of a 50-percent characteristic with a base of 92,001 is 1.0 percentage points. From the table of cumulative age distribution, the percentage point that corresponds to 45 years is 47.4 percent and to 50 years is 61.8 percent. The lower confidence limit corresponding to 49.0 percent (50 percent minus 1.0 percent) is found by linear interpolation between 45 years and 50 years to be 45.6 years, i.e.,

$$45 + [(50-45) \left(\frac{49.0-47.4}{61.8-47.4} \right)] = 45.6$$

Similarly, the upper confidence limit corresponding to 51.0 percent (50 percent plus 1.0 percent) is found to be 46.3 years. Consequently, the 68-percent confidence interval,

as shown by the data, is from 45.6 years to 46.3 years. Likewise, we could conclude that the 95-percent confidence interval is from 45.2 years (the distribution point corresponding to 48.0 percent) to 46.6 years (corresponding to 52.0 percent).

NONSAMPLING ERRORS


In general, nonsampling errors can be attributed to many sources: inability to obtain information about all cases; definitional difficulties; differences in the interpretation of questions; inability or unwillingness to provide correct information on the part of the respondents; mistakes in recording or coding the data; and other errors of collection, response, processing, coverage, and estimation for missing data. As the above list indicates, nonsampling errors are not unique to sample surveys, since they can, and do, occur in complete censuses as well.

The primary source of nonsampling error in the 1978 National Sample survey is probably the high nonresponse rate. An adjustment in the estimation procedure for the 23-percent noninterview rate in the 1972 survey and the additional 19-percent nonresponse rate in 1978 was made, but there still remains some unknown bias in the estimates due to differences in the characteristics of those who were interviewed in 1978 and those who were not.

It should also be pointed out that estimates for this survey do not represent those who have entered the labor force in scientific and engineering fields since 1970. In particular, this survey does not include the large numbers of graduates produced since 1970. This causes significant biases for such items as the relative distributions of sex, age, and race and the unemployment figures if the results are assumed to be indicative of the current scientific and engineering fields including new entrants since 1970.

Appendix C. Questionnaire and Reference Lists

O.M.B. No. 99-S77003; Approval Expires December 31, 1978

FORM PMS-26D (9-26-77)	U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS	NOTICE - Your report to the Census Bureau is confidential. It may be seen only by sworn Census employees and may be used only for statistical purposes.		
1978 NATIONAL SURVEY OF NATURAL AND SOCIAL SCIENTISTS AND ENGINEERS		<p><i>Please read</i> instructions carefully before answering questions.</p> <p>Answer as accurately as you can by printing your reply clearly or by entering an "X" in the box next to the appropriate reply.</p> <p>When the instructions for a question direct you to enter a code and description from a list, please refer to the reference list attached to this questionnaire.</p>		
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; text-align: center;"> PLEASE COMPLETE AND RETURN TO </td> <td style="width: 40%;"> Bureau of the Census 1201 East Tenth Street Jeffersonville, Indiana 47132 </td> </tr> </table>	PLEASE COMPLETE AND RETURN TO	Bureau of the Census 1201 East Tenth Street Jeffersonville, Indiana 47132
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<p>A. Do you currently live in the State (or foreign country) printed in the above mailing label?</p> <p>1 <input type="checkbox"/> Yes, same State (or foreign country)</p> <p>2 <input type="checkbox"/> No, different State (or foreign country) - Please enter your current State (or foreign country) of residence _____</p> <div style="text-align: right; margin-top: 10px;"> 3 <table border="1" style="display: inline-table; width: 40px; height: 20px; vertical-align: middle;"></table> </div>				
<p style="text-align: center;">FROM THE DIRECTOR BUREAU OF THE CENSUS</p> <p>This is the final questionnaire for the series of surveys known as the National Sample of Scientists and Engineers. The National Science Foundation, the project sponsor, and the Bureau of the Census wish to thank you for your invaluable contribution to this program. Each of the biennial surveys has given policymakers and planners an increasingly clearer view of the dynamics of the educational system and the job market for one of the Nation's central resources—highly trained persons. The goal of this final survey is to complete the picture for the decade of the 1970's.</p> <p>Thus, we are asking you to provide one final report on your employment and related topics. The questionnaire is much shorter than previous ones. Please note that the sample includes many kinds of highly trained persons in addition to scientists and engineers. For the survey to be successful and yield truly representative information, it is important that each person fill out and return the questionnaire.</p> <p>Please complete the questions which follow on pages 2 through 4 and return your questionnaire in the enclosed preaddressed envelope. For some questions you are instructed to enter a code and description from Reference List A, B, or C. These lists are attached to the questionnaire.</p> <p>This information is being collected under the authority of the National Science Foundation Act of 1950, as amended. The information you provide is confidential and may be seen only by sworn employees of the Bureau of the Census. The information cannot be used for anything but statistical purposes and cannot be given to any other Government agency, private concern, or individual. The data will be released only in the form of statistical summaries from which it will be impossible to identify information about any particular person. Your response is entirely voluntary, and your failure to provide some or all of the requested information will in no way adversely affect you.</p> <p>Thank you for your cooperation.</p> <p>Sincerely,</p> <div style="text-align: center; margin-top: 20px;">  MANUEL D. PLOTKIN </div> <p>Enclosure</p>				

PART I - EDUCATION AND TRAINING																	
1. Since January 1972 have you attended any college, university, or other post high school institution?	1 <input type="checkbox"/> Yes - Continue with question 2a 2 <input type="checkbox"/> No - Skip to question 4																
2a. What is the highest degree you have RECEIVED since January 1972? <i>Mark only one box</i>	1 <input type="checkbox"/> Associate 2 <input type="checkbox"/> Registered Nurse (R.N.) 3 <input type="checkbox"/> Bachelor's 4 <input type="checkbox"/> Master's 5 <input type="checkbox"/> First Professional Non-Medical (J.D., LL.B., Th.B.) 6 <input type="checkbox"/> First Professional Medical (D.D.M., D.D.S., D.O., D.V.M., M.D.) 7 <input type="checkbox"/> Doctorate 8 <input type="checkbox"/> Other - Specify _____ 9 <input type="checkbox"/> None - Skip to question 4																
b. When was this degree awarded? <i>If you received more than one degree at the same level (e.g., two master's degrees), enter the year of award of the most recent one.</i>	19 ____																
3. What was the major field of study of the degree you described in question 2? <i>Enter code and description from Reference List A.</i>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Code</th> <th>Description from Reference List A</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"> </td> <td> </td> </tr> <tr> <td style="height: 20px;"> </td> <td> </td> </tr> </tbody> </table>	Code	Description from Reference List A														
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4. Aside from formal education, which of the following types of training did you receive in 1976 or 1977? <i>Mark the appropriate year for each type of training you have received.</i>	<table style="width: 100%;"> <thead> <tr> <th style="width: 50%; text-align: left;">a. 1976</th> <th style="width: 50%; text-align: left;">b. 1977</th> </tr> </thead> <tbody> <tr><td>1 <input type="checkbox"/> On-the-job training</td><td>1 <input type="checkbox"/></td></tr> <tr><td>2 <input type="checkbox"/> Military training applicable to civilian occupations</td><td>2 <input type="checkbox"/></td></tr> <tr><td>3 <input type="checkbox"/> Extension or correspondence courses</td><td>3 <input type="checkbox"/></td></tr> <tr><td>4 <input type="checkbox"/> Courses at employer's training facility</td><td>4 <input type="checkbox"/></td></tr> <tr><td>5 <input type="checkbox"/> Courses at adult education center</td><td>5 <input type="checkbox"/></td></tr> <tr><td>6 <input type="checkbox"/> Other training</td><td>6 <input type="checkbox"/></td></tr> <tr><td>7 <input type="checkbox"/> None</td><td>7 <input type="checkbox"/></td></tr> </tbody> </table>	a. 1976	b. 1977	1 <input type="checkbox"/> On-the-job training	1 <input type="checkbox"/>	2 <input type="checkbox"/> Military training applicable to civilian occupations	2 <input type="checkbox"/>	3 <input type="checkbox"/> Extension or correspondence courses	3 <input type="checkbox"/>	4 <input type="checkbox"/> Courses at employer's training facility	4 <input type="checkbox"/>	5 <input type="checkbox"/> Courses at adult education center	5 <input type="checkbox"/>	6 <input type="checkbox"/> Other training	6 <input type="checkbox"/>	7 <input type="checkbox"/> None	7 <input type="checkbox"/>
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7 <input type="checkbox"/> None	7 <input type="checkbox"/>																
PART II - EMPLOYMENT STATUS																	
5a. What was your employment status during the week of February 12-18, 1978?	1 <input type="checkbox"/> Employed full time (including self-employed full time) - Skip to 6a 2 <input type="checkbox"/> Employed part time (including self-employed part time) - Answer 5b 3 <input type="checkbox"/> Unemployed and seeking work - Go to Part III 4 <input type="checkbox"/> Not employed and not seeking work - Skip to 7																
b. If you worked part time, were you seeking full-time work?	1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No																
6a. Were you working in a position related to science or engineering during the week of February 12-18, 1978?	1 <input type="checkbox"/> Yes - Go to Part III 2 <input type="checkbox"/> No - Answer 6b																
b. What was the most important reason for taking this position? <i>Mark only one box</i>	1 <input type="checkbox"/> Preferred nonscience or nonengineering position 2 <input type="checkbox"/> Promoted out of science or engineering position 3 <input type="checkbox"/> Pay was better in nonscience or nonengineering position 4 <input type="checkbox"/> Locational preference 5 <input type="checkbox"/> Science or engineering position not available 6 <input type="checkbox"/> Other - Specify _____ <div style="text-align: right;"><i>(Go to Part III)</i></div>																
7. If you were not employed and not seeking work during the week of February 12-18, 1978, what was your most important reason for not seeking work? <i>Mark only one box</i>	1 <input type="checkbox"/> On vacation or otherwise temporarily absent from a job for health or personal reasons 2 <input type="checkbox"/> On layoff from a job 3 <input type="checkbox"/> Retired 4 <input type="checkbox"/> Student 5 <input type="checkbox"/> Tending to family responsibilities 6 <input type="checkbox"/> Could not find work or believed no jobs available in my particular field 7 <input type="checkbox"/> Other - Specify _____ <div style="text-align: right;"><i>(Go to Part III)</i></div>																

PART III - JOB ACTIVITIES																																																				
INSTRUCTIONS a. Complete questions 8-15 for the job held during the week of February 12-18, 1978, or, if you did not hold a job during that week, complete these questions for your most recent job prior to that week. b. If you held more than one job, please report only the job at which you worked the greatest number of hours.																																																				
8. Where did you work? <i>Write in city and State or foreign country of company, business, agency, or other employer.</i>	Job held during the week of February 12-18, 1978, or most recent prior job. City _____ State or foreign country _____																																																			
9. What kind of business was this? <i>Enter code and description from Reference List B.</i>	Code _____ Description from Reference List B _____																																																			
10. What was your occupation? <i>Enter code and description from Reference List C.</i>	Code _____ Description from Reference List C _____																																																			
11a. What percent of working time did you devote to each of the following activities? Entries should sum to 100%. PLEASE NOTE Basic research is study directed toward gaining scientific knowledge primarily for its own sake. Applied research is study directed toward gaining scientific knowledge in an effort to meet a recognized need. Development is direction of the knowledge gained from research toward production of useful materials, devices, systems, and methods.	<table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 5%;">01 _____</td><td style="width: 5%;">%</td><td>Management or administration of research and development</td></tr> <tr><td>02 _____</td><td>%</td><td>Management or administration of other than research and development</td></tr> <tr><td>03 _____</td><td>%</td><td>Teaching and training - preparing and teaching courses, guiding and counseling students or trainees</td></tr> <tr><td>04 _____</td><td>%</td><td>Basic research</td></tr> <tr><td>05 _____</td><td>%</td><td>Applied research</td></tr> <tr><td>06 _____</td><td>%</td><td>Development - product, process, and technical development</td></tr> <tr><td>07 _____</td><td>%</td><td>Report and technical writing, editing, information retrieval</td></tr> <tr><td>08 _____</td><td>%</td><td>Clinical diagnosis</td></tr> <tr><td>09 _____</td><td>%</td><td>Design of equipment, processes, models</td></tr> <tr><td>10 _____</td><td>%</td><td>Quality control, testing, evaluation, or inspection</td></tr> <tr><td>11 _____</td><td>%</td><td>Operations - production, maintenance, construction, installation</td></tr> <tr><td>12 _____</td><td>%</td><td>Distribution - sales, traffic, purchasing, customer and public relations</td></tr> <tr><td>13 _____</td><td>%</td><td>Statistical work - survey work, forecasting, statistical analysis</td></tr> <tr><td>14 _____</td><td>%</td><td>Consulting</td></tr> <tr><td>15 _____</td><td>%</td><td>Computer applications</td></tr> <tr><td>16 _____</td><td>%</td><td>Other activities - Specify _____</td></tr> <tr><td colspan="3" style="text-align: center;">TOTAL=100%</td></tr> </table>	01 _____	%	Management or administration of research and development	02 _____	%	Management or administration of other than research and development	03 _____	%	Teaching and training - preparing and teaching courses, guiding and counseling students or trainees	04 _____	%	Basic research	05 _____	%	Applied research	06 _____	%	Development - product, process, and technical development	07 _____	%	Report and technical writing, editing, information retrieval	08 _____	%	Clinical diagnosis	09 _____	%	Design of equipment, processes, models	10 _____	%	Quality control, testing, evaluation, or inspection	11 _____	%	Operations - production, maintenance, construction, installation	12 _____	%	Distribution - sales, traffic, purchasing, customer and public relations	13 _____	%	Statistical work - survey work, forecasting, statistical analysis	14 _____	%	Consulting	15 _____	%	Computer applications	16 _____	%	Other activities - Specify _____	TOTAL=100%		
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b. Among all these activities, which was your primary and which was your major secondary work activity? <i>Fill in the appropriate code numbers (01-16) from question 11a.</i>	Code (01-16 from Question 11a). <input type="checkbox"/> Primary work activity <input type="checkbox"/> Secondary work activity																																																			
12. Which category best describes the type of organization of your principal employment or postdoctoral appointment? <i>Mark only one box</i>	<table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 5%;">01 <input type="checkbox"/></td><td>Business or industry, including self-employed</td></tr> <tr><td>02 <input type="checkbox"/></td><td>Junior college, 2-year college, technical institute</td></tr> <tr><td>03 <input type="checkbox"/></td><td>Medical school</td></tr> <tr><td>04 <input type="checkbox"/></td><td>4-year college or university, other than medical school</td></tr> <tr><td>05 <input type="checkbox"/></td><td>Elementary or secondary school system</td></tr> <tr><td>06 <input type="checkbox"/></td><td>Hospital or clinic</td></tr> <tr><td>07 <input type="checkbox"/></td><td>Non-profit organization, other than hospital, clinic, or educational institution</td></tr> <tr><td>08 <input type="checkbox"/></td><td>U.S. military service, active duty, or Commissioned Corps, e.g., USPHS, NOAA</td></tr> <tr><td>09 <input type="checkbox"/></td><td>U.S. Government, civilian employee</td></tr> <tr><td>10 <input type="checkbox"/></td><td>State government</td></tr> <tr><td>11 <input type="checkbox"/></td><td>Local or other government - Specify _____</td></tr> <tr><td>12 <input type="checkbox"/></td><td>International agency</td></tr> <tr><td>13 <input type="checkbox"/></td><td>Other - Specify _____</td></tr> </table>	01 <input type="checkbox"/>	Business or industry, including self-employed	02 <input type="checkbox"/>	Junior college, 2-year college, technical institute	03 <input type="checkbox"/>	Medical school	04 <input type="checkbox"/>	4-year college or university, other than medical school	05 <input type="checkbox"/>	Elementary or secondary school system	06 <input type="checkbox"/>	Hospital or clinic	07 <input type="checkbox"/>	Non-profit organization, other than hospital, clinic, or educational institution	08 <input type="checkbox"/>	U.S. military service, active duty, or Commissioned Corps, e.g., USPHS, NOAA	09 <input type="checkbox"/>	U.S. Government, civilian employee	10 <input type="checkbox"/>	State government	11 <input type="checkbox"/>	Local or other government - Specify _____	12 <input type="checkbox"/>	International agency	13 <input type="checkbox"/>	Other - Specify _____																									
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PART III - JOB ACTIVITIES - Continued									
Job held during week of February 12-18, 1978, or most recent prior job									
13. What was the basic salary associated with this position? (If not working during February 12-18, report ending salary of most recent prior job.) <small>If you were on a postdoctoral appointment, include stipend plus allowances. (Basic salary refers to salary before deductions for income tax, social security, retirement, etc. but does not include bonuses, overtime, summer teaching, or other payment for secondary jobs.)</small>	a. \$ _____ .00 b. 1 <input type="checkbox"/> Per year 2 <input type="checkbox"/> Per month 3 <input type="checkbox"/> Per week c. If academically employed, mark whether salary is for - 1 <input type="checkbox"/> 9-10 months 2 <input type="checkbox"/> 11-12 months								
14. Between what dates did you hold this position? <small>Enter month and year</small> <small>Consider a change in positions to have occurred if there were significant changes in your duties, level of responsibility, or occupation, even if you continued to work for the same employer.</small>	a. Beginning month and year: _____ b. Ending month and year: _____ OR <input type="checkbox"/> Present								
15a. Was ANY of your work supported or sponsored by U.S. Government funds?	1 <input type="checkbox"/> Yes - Continue with 15b 2 <input type="checkbox"/> No 3 <input type="checkbox"/> Don't know } Skip to 16a								
b. Which of the following agencies or departments were supporting the work? <small>Mark as many as apply</small>	<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> 01 <input type="checkbox"/> AID (Agency for International Development) 02 <input type="checkbox"/> Department of Agriculture 03 <input type="checkbox"/> Department of Commerce 04 <input type="checkbox"/> Department of Defense 05 <input type="checkbox"/> Department of Energy 06 <input type="checkbox"/> Department of Health, Education, and Welfare Alcohol and Drug Abuse Mental Health Administration 07 <input type="checkbox"/> NIH (National Institutes of Health) 08 <input type="checkbox"/> Office of Education 09 <input type="checkbox"/> Other HEW - Specify _____ 10 <input type="checkbox"/> Department of Housing and Urban Development </div> <div style="width: 50%;"> 11 <input type="checkbox"/> Department of the Interior 12 <input type="checkbox"/> Department of Justice 13 <input type="checkbox"/> Department of Labor 14 <input type="checkbox"/> Department of Transportation 15 <input type="checkbox"/> EPA (Environmental Protection Agency) 16 <input type="checkbox"/> NASA (National Aeronautics and Space Administration) 17 <input type="checkbox"/> NSF (National Science Foundation) 18 <input type="checkbox"/> Nuclear Regulatory Commission 19 <input type="checkbox"/> Other agency or department - Specify _____ 20 <input type="checkbox"/> Don't know source agency or department </div> </div>								
PART IV - OTHER INFORMATION									
16a. At anytime during calendar year 1977 were you without a job AND actively seeking employment?	1 <input type="checkbox"/> Yes - Continue with 16b 2 <input type="checkbox"/> No - Skip to question 17								
b. For how many weeks were you seeking employment?	1 <input type="checkbox"/> 1 to 4 weeks 2 <input type="checkbox"/> 5 to 10 weeks 3 <input type="checkbox"/> 11 to 14 weeks 4 <input type="checkbox"/> 15 to 26 weeks 5 <input type="checkbox"/> 27 weeks or more								
17. How many years of professional experience, including teaching, have you had? <small>Enter number of years</small>	_____ Years								
18. Based on your total education and experience, what do you regard yourself as professionally? <small>Enter code and description from Reference List C.</small>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Code</th> <th>Description from Reference List C</th> </tr> </thead> <tbody> <tr> <td style="height: 20px;"> </td> <td> </td> </tr> <tr> <td style="height: 20px;"> </td> <td> </td> </tr> </tbody> </table>			Code	Description from Reference List C				
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19. Listed at the right are selected topics of critical national interest. If you devote a significant proportion of your professional time to any of these problem areas, please mark the box for the one on which you spend the MOST time. <small>Mark only one box</small>	<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> 01 <input type="checkbox"/> Health 02 <input type="checkbox"/> Environment protection, pollution control Education: 03 <input type="checkbox"/> Teaching 04 <input type="checkbox"/> Other 05 <input type="checkbox"/> Space 06 <input type="checkbox"/> National defense 07 <input type="checkbox"/> Crime prevention and control </div> <div style="width: 50%;"> 08 <input type="checkbox"/> Food production and technology 09 <input type="checkbox"/> Energy and fuel 10 <input type="checkbox"/> Other mineral resources 11 <input type="checkbox"/> Community development and services 12 <input type="checkbox"/> Housing (planning, design, construction) 13 <input type="checkbox"/> Other - Specify _____ 14 <input type="checkbox"/> Does not apply </div> </div>								
20a. Are you physically handicapped?	1 <input type="checkbox"/> Yes - Continue with 20b 2 <input type="checkbox"/> No - Skip to question 21								
b. What is the nature of your handicap(s)? <small>Mark as many as apply</small>	1 <input type="checkbox"/> Visual 2 <input type="checkbox"/> Auditory 3 <input type="checkbox"/> Orthopedic 4 <input type="checkbox"/> Other - Specify _____								
21. Is your ethnic heritage Hispanic? <small>(Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture)</small>	1 <input type="checkbox"/> Yes 2 <input type="checkbox"/> No								
22. In the event that it is necessary to contact you to clarify some of the information you provided, may we contact you by telephone?	<div style="display: flex; align-items: center;"> <input type="checkbox"/> Yes - Enter number(s) on which you can be reached → </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> No </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 40%;">Area code</th> <th>Telephone number</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			Area code	Telephone number				
Area code	Telephone number								
23. Please print your name here	Date prepared _____								

REFERENCE LIST A -- MAJOR FIELDS OF STUDY

This list is to be used in answering question 3 about the field in which you have obtained study or training. It is divided into two sections: Section I is a list of fields of academic study generally leading to bachelor's or higher degrees; Section II is a list of fields of study and training below those generally leading to a bachelor's degree.

Please scan the entire list, choose the appropriate answer for the question and then enter the code and description in the appropriate section of question 3. If none of the categories listed below adequately describes what you were studying or being trained in, use the "Other" category (code 600 or 625) and enter a brief description of what you were studying in the space provided on the questionnaire.

Section I -- FIELDS OF ACADEMIC STUDY LEADING TO BACHELOR'S OR HIGHER DEGREES

Code	Description	Code	Description
Biological and Agricultural Sciences and Related Fields		Mathematical Sciences	
501	Agriculture, business	557	Mathematics
502	Agriculture, general	558	Statistics and actuarial sciences
503	Agronomy, field crops	559	Computer sciences and systems analysis
504	Anatomy and histology	500	Operations research/management science
505	Animal physiology		
506	Animal science	Physical Sciences	
507	Bacteriology, virology, mycology, parasitology	560	Astronomy
508	Brochemistry	561	Chemistry
509	Biology, general	593	Geography
510	Biophysics	563	Meteorology
511	Botany, general	564	Physics
512	Dairy science (dairy husbandry)	565	Physical sciences, general
513	Entomology	566	Geology and geophysics
514	Farm management	567	Oceanography
515	Fish and game or wildlife management	568	Physical sciences, other fields
516	Food science (food technology and processing, dairy manufacturing and technology, food industry)		
517	Forestry	Psychology	
518	Genetics	569	Clinical
519	Horticulture	570	Educational
520	Immunology	571	General psychology
521	Microbiology	572	Psychology, other fields
522	Plant pathology		
523	Plant physiology	Social Sciences	
524	Soil science (soil management, soil conservation)	573	Anthropology
525	Zoology, general	574	Area studies, regional studies
526	Biological and agricultural sciences, other fields	575	Economics, agricultural
		576	Economics, except agricultural
Education		577	Foreign service programs
527	Biological sciences education	593	Geography
528	Mathematics education	579	History
529	Physical sciences education	580	Industrial relations
530	Trade and industrial training	581	International relations
531	Education, other fields	582	Political science or government
Engineering		583	Public administration
532	Aerospace, aeronautical, astronautical, and related fields	584	Social sciences, general
533	Agricultural	585	Social work, social administration, social welfare
534	Architectural	586	Sociology
535	Chemical, petroleum refining	587	Social sciences, other fields
536	Civil, construction, transportation		
537	Electrical, electronics	Arts, Humanities, and Other Specialties	
538	Engineering sciences, mechanics, physics	588	Arts, general
539	Engineering technology	589	Business and commerce, including accounting, hotel and restaurant administration, and secretarial studies
540	Environmental sanitary engineering	590	English and journalism
541	General or unified	591	Fine and applied arts, all fields
542	Industrial	592	Foreign language and literature, all fields
543	Mechanical	593	Geography
544	Metallurgical, materials, ceramics	594	Home economics, all fields
545	Mining, mineral, geological	595	Law or prelaw
546	Naval architecture and marine engineering	596	Library science
547	Nuclear	597	Military science, including merchant marine deck officer
548	Operations research systems engineering	598	Philosophy, all fields
549	Petroleum	599	Religion and theology, all fields
550	Engineering, other fields	600	Other (Describe briefly under the applicable item on the questionnaire.)
Health Fields			
551	Medicine or premedicine, and clinical medical sciences		
552	Nursing (4 year or longer program)		
553	Pathology		
554	Pharmacology		
555	Pharmacy		
556	Health professions, other fields (4 year or longer program)		

Section II -- FIELDS OF ACADEMIC STUDY AND OCCUPATIONAL TRAINING RELATED TO PROGRAMS BELOW THE BACCALAUREATE

Code	Description	Code	Description
Data Processing-related fields of study or training		Other fields of study or training	
601	Computer programming	616	Business and commerce-related fields of study or training
602	Computer operating	617	Craft (skilled) occupations-related fields of study or training (such as carpentry, bricklaying, tool and die making, etc.)
603	All other data processing fields of study or training	618	Educational-related fields of study or training
Engineering-related fields of study or training		619	Home economics
604	Drafting and design, all fields	620	Nursing and other health service-related fields of study or training
605	Aeronautical technology	621	Operative occupations-related fields of study or training (such as machine operation, driving, inspecting, etc.)
606	Architectural or building technology	622	Police technology or law enforcement
607	Chemical technology	623	Sales and marketing-related fields of study or training
608	Civil technology	624	Service occupations-related fields of study or training (such as cook, beautician, firefighter, etc.)
609	Electrical and electronics technology	625	All other fields of study or training (Describe briefly under the applicable item on the questionnaire.)
610	Industrial technology		
611	Mechanical technology		
612	All other engineering-related fields of study or training		
Science-related fields of study or training			
613	Agriculture		
614	Forestry		
615	Other science-related fields of study or training		

REFERENCE LIST B - KINDS OF BUSINESSES

This list is to be used in answering question 9 about the kind of business or industry for which you worked. Please scan the entire list, choose the appropriate answer for the question and enter the code and description from this list. If none of the categories listed below adequately describes the kind of business for which you worked, use the "Other" category (code 731).

Code	Description	Code	Description
Manufacturing		Other Kinds of Business	
701	Aircraft, aircraft engines, aircraft parts	720	Agriculture, forestry, and fisheries
702	Chemicals and allied products	721	Business, personal, and professional services
703	Electrical machinery, equipment and supplies for the generation, storage, transformation, transmission, and utilization of electrical energy	722	Construction
704	Electronic apparatus, radio, television and communication equipment and parts	723	Engineering or architectural services
705	Electronic computers, accounting, calculating and office machinery and equipment	724	Finance, insurance, or real estate
706	Fabricated metal products (except ordnance, machinery and transportation equipment)	725	Mining and petroleum extraction
707	Machinery (except electrical) including engines and turbines, farming and construction machinery, mining, metalworking and other manufacturing and service industry machines	726	Private, nonprofit organizations other than educational institutions and hospitals
708	Motor vehicles and motor vehicle equipment including trucks, buses, automobiles, railroad engines and cars	727	Professional and technical societies
709	Ordnance, including manufacture of arms, ammunition, tanks, and complete guided missiles, space vehicles and equipment	728	Research institutions
710	Petroleum refining and related industries	729	Retail and wholesale trade
711	Primary metal industries, including smelting, refining, rolling, drawing, alloying, and manufacture of castings, forgings and other basic metal products	730	Transportation, communication, or other public utilities
712	Professional and scientific equipment and supplies	731	Other (Describe briefly under the applicable item on the questionnaire.)
713	Other manufacturing including printing and publishing		
Educational Institutions		Public Administration (Include only uniquely governmental activities, such as the U.S. Postal Service, U.S. Air Force, State court, Department of Motor Vehicles, city building inspection, or city public welfare. For example, if you work for the U.S. Postal Service use code 733, Federal public administration; on the other hand, if you work at a Veterans' Administration Hospital, use code 718, Hospital or clinic; if you work at a State university, use code 714, College or university; if you work for a county road building agency, use code 722, Construction; if you work in a Defense Department research laboratory, use code 728, Research institution.)	
714	College or university (offering at least a bachelor's degree)	732	Uniformed military service
715	Junior college or technical institute	733	Federal public administration
716	Medical school	734	State public administration
717	Other educational institutions	735	Local public administration (city, county, etc.)
Health Services		737	Regional government
718	Hospital or clinic	736	Other government
719	Other medical and health services		

REFERENCE LIST C - OCCUPATIONS

This list is to be used in answering questions 10 and 18 about your occupational classification. Please scan the entire list, choose the appropriate entry and enter the code and description from this list. If you cannot find exactly the right entry, please choose the one that comes nearest to it. If none of the entries is at all appropriate, use the "Other" category (code 475) and enter a brief description in the space provided on the questionnaire.

Code	Description	Code	Description
Engineers, including college professors and instructors		Health Occupations, including persons who are primarily practitioners. Persons engaged primarily in medical research, teaching, and similar activities use code 432, Medical scientist.	
401	Engineer, aeronautical and astronautical	438	Physician or surgeon
402	Engineer, agricultural	439	Technician, dental
403	Engineer, chemical	440	Technician, medical
404	Engineer, civil and architectural	441	Other health occupation (Describe briefly under the applicable item on the questionnaire.)
405	Engineer, electrical and electronic	Technicians and Technologists, except medical	
406	Engineer, industrial	442	Designer, electronic parts and machine tools
407	Engineer, mechanical	443	Designer, industrial
408	Engineer, metallurgical and materials	444	Designer, other
409	Engineer, mining, petroleum, and geological	445	Draftsman
410	Engineer, nuclear	446	Surveyor
411	Engineer, environmental and sanitary	447	Technician, biological and agricultural
412	Engineer, operations research systems	448	Technician, electrical and electronic
413	Engineer, other fields (Describe briefly under the applicable item on the questionnaire.)	449	Technician, construction, highways, and architectural
Computer Specialist, including college professors and instructors		450	Technician, mechanical
414	Computer programmer	451	Technician, other engineering
415	Computer systems analyst	452	Technician, physical science
416	Computer scientist	453	Technician, other fields (Describe briefly under the applicable item on the questionnaire.)
417	Other computer specialist (Describe briefly under the applicable item on the questionnaire.)	Teachers	
Mathematicians and Statisticians, including college professors and instructors		454	Teacher, elementary school
418	Actuary	455	Teacher, secondary school
419	Mathematician	456	Teacher, college and university, excluding engineering and science (Engineering and science teachers see codes 401-437 above.)
420	Statistician	Administrators, Managers, and Officials, excluding farm	
421	Operations research analyst	476	Urban and regional planner
Physical Scientists, including college professors and instructors		457	College president or dean
422	Chemist	458	Administrator or manager, scientific and technical research and development
423	Earth scientists including geologists, geophysicists, etc.	459	Administrator or manager, production and operations
424	Physicist, astronomer	460	Administrator, manager, or official, all other, excluding self-employed
425	Atmospheric scientist, meteorologist	461	Self-employed proprietor
426	Oceanographer	All Other Occupations	
427	Other physical scientist (Describe)	462	Accountant
Biological Scientists, including college professors and instructors		463	Attorney or judge
428	Agricultural scientists, including foresters and conservationists	464	Sales worker
429	Biological scientist	465	Clerical worker (such as bookkeeper, secretary, etc.)
430	Bichemist	466	Clergy
431	Biophysicist	467	Craft worker (such as baker, carpenter, electrician, mechanic, repair worker)
432	Medical scientist, excluding persons who are primarily medical practitioners; see Health Occupations	468	Farmer (owner, manager, tenant, or farm laborer)
433	Other biological scientist (Describe)	469	Fire fighter or police
Social scientists, including college professors and instructors		470	Laborer, except farm
434	Economist	471	Librarian
435	Psychologist	472	Merchant or shopkeeper, self-employed
436	Sociologist or anthropologist	473	Operative (such as assembler, factory worker, miner, welder, truck driver, etc.)
437	Other social scientist (Describe briefly under the applicable item on the questionnaire.)	474	Postal worker
		475	Other occupations, not specified above (Describe briefly under the applicable item on the questionnaire.)

Appendix D. Source of Data

Characteristic	Table number	Item number on 1978 questionnaire
Age in 1978*.....	1	(From the 1970 census response)
Sex.....	1	(From the 1972 survey response, if available; otherwise from the 1970 census response)
Race*.....	1	(From the 1970 census response)
Residence in 1978.....	1	A, page 1
Professional identification.....	1	Part IV, 18
Hispanic heritage.....	1	Part IV, 21
Occupation in 1978.....	1	Part III, 10
Highest degree held*.....	2	2a; otherwise from 1976, 1974, or 1972 survey response
Major field of study for highest degree held*.....	2	3; otherwise from 1976, 1974, or 1972 survey response
Type of supplementary training: 1977.....	2	Part I, 4b
Job and occupational mobility: 1976, 1978*.....	3	1976 survey response and Part III, 10, 14
Job and occupational mobility: 1974, 1978*.....	3	1974 survey response and Part III, 10, 14
Job and occupational mobility: 1972, 1978*.....	3	1972 survey response and Part III, 10, 14
Years of professional experience*.....	3	Part IV, 17
Type of employer.....	4	Part III, 12
Federal support.....	4	Part III, 15a, 15b
Unemployment status: 1977.....	4	Part IV, 16a, 16b
Employment status: February 1978*.....	4	Part II, 5a, 5b, 7
Full-time employment in science or engineering: February 1978.....	4	Part II, 6a, 6b
National interest topics.....	4	Part IV, 19
Kind of business.....	4	Part III, 9
Primary work activity*.....	4	Part III, 11b
Annual salary rate: 1978.....	5	Part III, 13

*For more information, see appropriate subject in appendix A.

Appendix E. Response Rates

Table E-1 presents response rates of various components of the sample for the 1978 National Survey of Natural and Social Scientists and Engineers. The characteristics presented here are based on the 1970 census or on the 1978, 1976, 1974, or 1972 surveys. Since the percentages in table E-1 are based on a complete count of the sample cases, no reference to the standard error tables is necessary.

Note that table E-1 contains data for 362 respondents whose data are not represented in the tables and text in the body of this report. Future pamphlets in this series will present the data in table E-1 exclusive of these 362 cases.

Table E-1. 1978 National Sample, by Field of Science or Engineering in 1976, 1974, and 1972, Age in 1978, and Sex, by Response in the 1978 National Survey

(Unweighted)

Sex, age in 1978, and field of science or engineering in 1976, 1974, and 1972	Response in 1978			
	Total		Respondents	Nonrespondents
	Number	Percent		
Total.....	50,093	100.0	82.1	17.9
SEX				
Male.....	46,877	100.0	82.3	17.7
Female.....	3,216	100.0	79.2	20.8
AGE IN 1978				
Under 30 years.....	287	100.0	76.7	23.3
30 to 34 years.....	6,264	100.0	76.3	23.7
35 to 39 years.....	9,226	100.0	78.7	21.3
40 to 44 years.....	8,075	100.0	82.1	17.9
45 to 49 years.....	7,644	100.0	84.0	16.0
50 to 54 years.....	6,994	100.0	85.8	14.2
55 to 59 years.....	5,183	100.0	86.5	13.5
60 to 64 years.....	3,193	100.0	86.0	14.0
65 to 69 years.....	1,930	100.0	82.8	17.2
70 years and over.....	1,297	100.0	76.9	23.1
FIELD OF SCIENCE OR ENGINEERING IN 1976				
Respondents in 1976.....	42,644	100.0	92.4	7.6
Total in-scope in 1976.....	37,602	100.0	92.7	7.3
Computer specialists.....	2,064	100.0	91.8	8.2
Engineers.....	19,922	100.0	92.0	8.0
Mathematical specialists.....	1,486	100.0	93.2	6.8
Life scientists.....	3,800	100.0	94.4	5.6
Physical scientists.....	4,695	100.0	94.1	5.9
Environmental scientists.....	1,749	100.0	92.8	7.2
Psychologists.....	1,936	100.0	92.7	7.3
Social scientists.....	1,950	100.0	93.0	7.0
Total out-of-scope in 1976.....	5,042	100.0	90.6	9.4
Nonrespondents in 1976.....	7,449	100.0	23.0	77.0
FIELD OF SCIENCE OR ENGINEERING IN 1974				
Respondents in 1974.....	44,158	100.0	89.5	10.5
Total in-scope in 1974.....	39,473	100.0	89.8	10.2
Computer specialists.....	2,291	100.0	88.1	11.9
Engineers.....	20,814	100.0	89.3	10.7
Mathematical specialists.....	1,612	100.0	89.8	10.2
Life scientists.....	4,026	100.0	91.5	8.5
Physical scientists.....	4,824	100.0	91.8	8.2
Environmental scientists.....	1,867	100.0	89.0	11.0
Psychologists.....	1,989	100.0	89.5	10.5
Social scientists.....	2,050	100.0	89.9	10.1
Total out-of-scope in 1974.....	4,685	100.0	86.9	13.1
Nonrespondents in 1974.....	5,935	100.0	27.3	72.7
FIELD OF SCIENCE OR ENGINEERING IN 1972				
Respondents in 1972.....	50,093	100.0	82.1	17.9
Total in-scope in 1972.....	50,093	100.0	82.1	17.9
Computer specialists.....	3,391	100.0	77.6	22.4
Engineers.....	25,797	100.0	81.9	18.1
Mathematical specialists.....	2,185	100.0	82.6	17.4
Life scientists.....	4,891	100.0	84.8	15.2
Physical scientists.....	6,248	100.0	84.7	15.3
Environmental scientists.....	2,095	100.0	82.9	17.1
Psychologists.....	2,488	100.0	80.5	19.5
Social scientists.....	2,998	100.0	80.2	19.8

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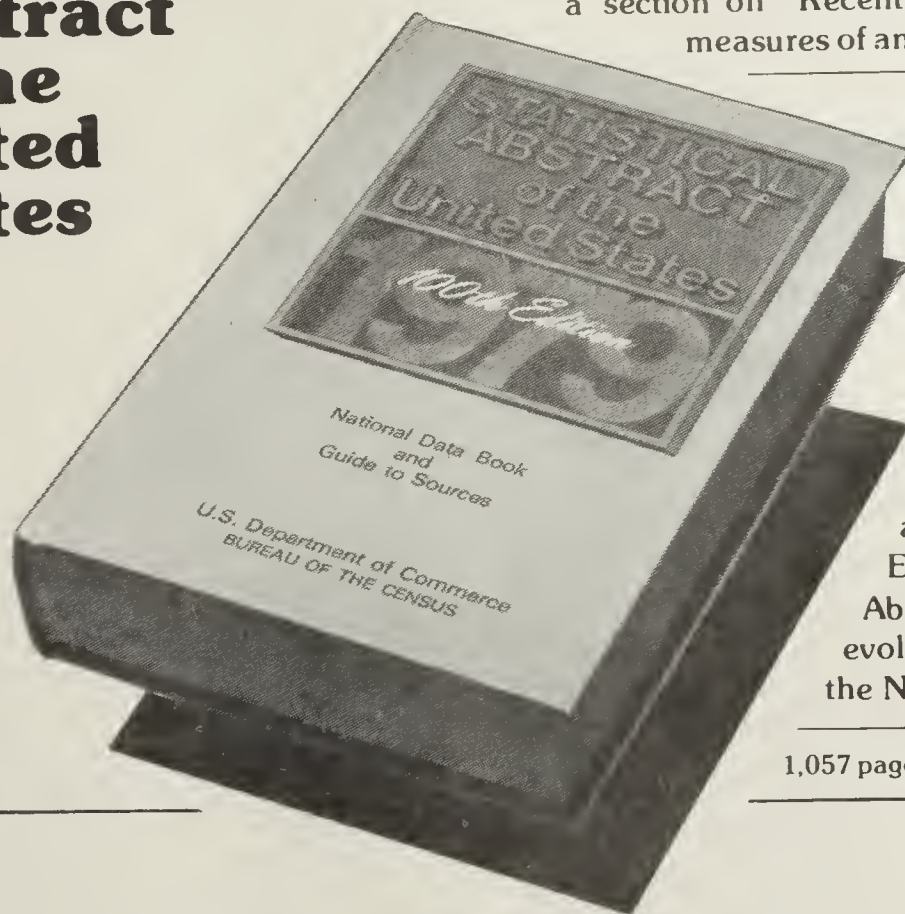
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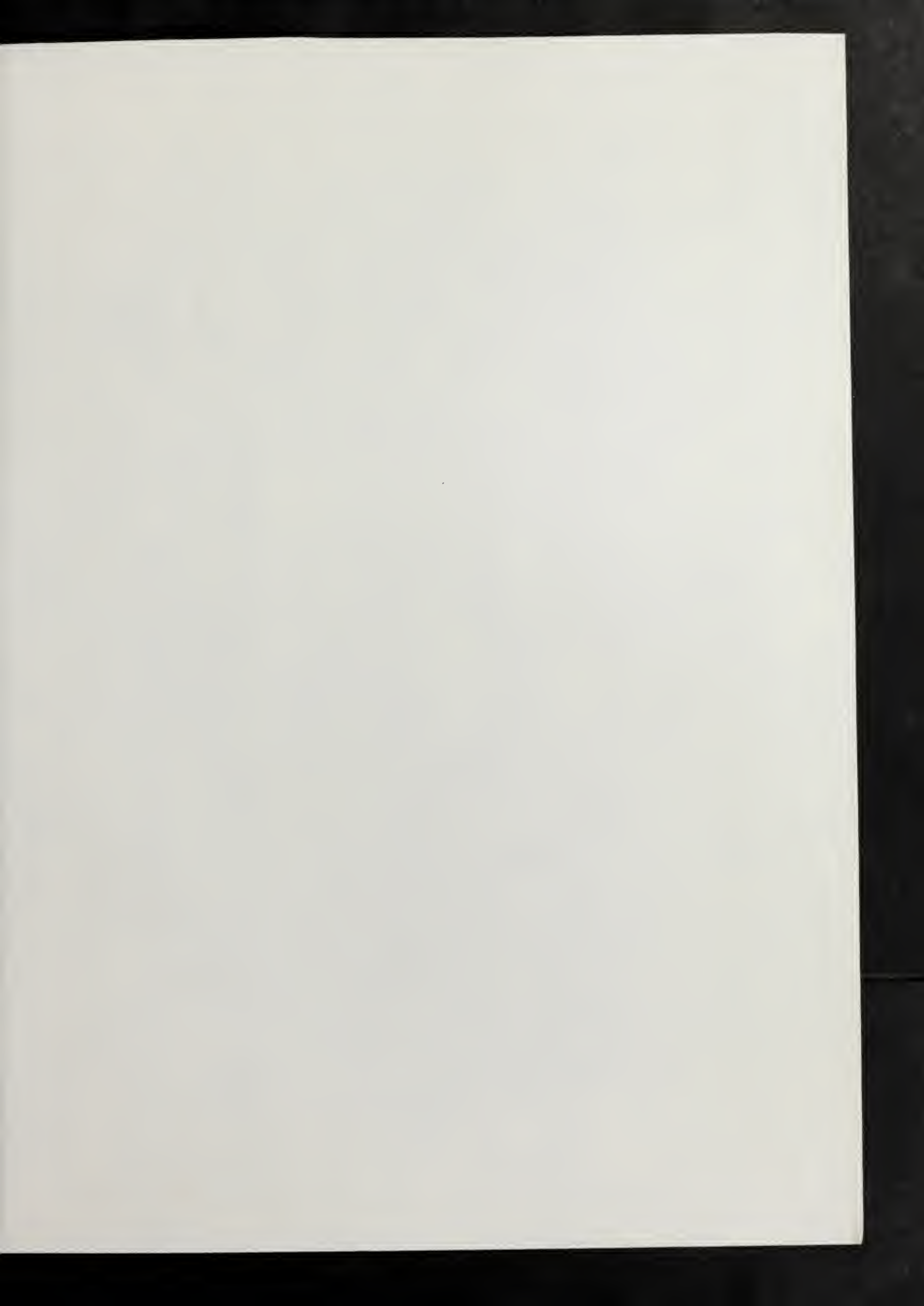
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